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Richter et al.

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(54) **METHOD AND DEVICE FOR PRESENTING SYNTHESIZED REALITY COMPANION CONTENT**

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G06T 11/00 (2006.01)
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(52) **U.S. Cl.**
CPC ***G06T 11/00*** (2013.01); *G06F 3/04883* (2013.01); *G06T 2200/24* (2013.01)

(58) **Field of Classification Search**
CPC combination set(s) only.
See application file for complete search history.

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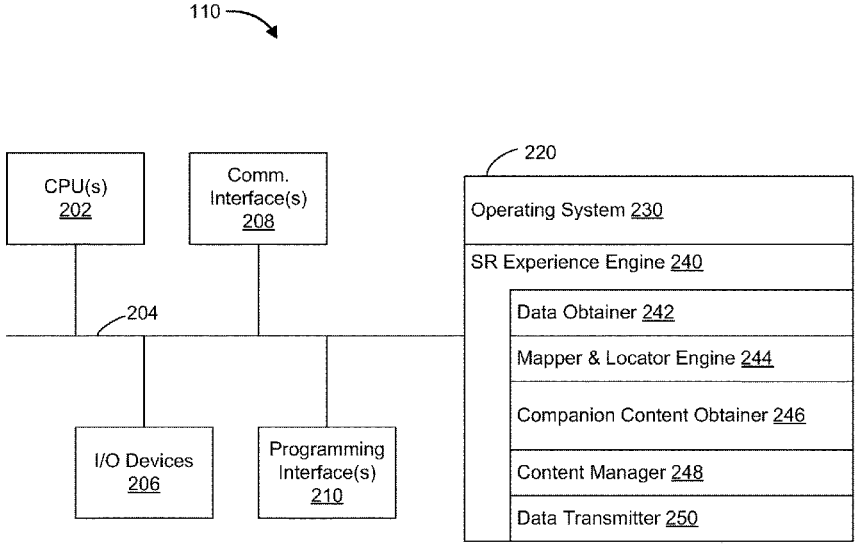
(74) *Attorney, Agent, or Firm* — Fernando & Partners, LLP

(57) **ABSTRACT**

In one implementation, a method includes: obtaining a user input to view SR content associated with video content; if the video content includes a first scene when the user input was detected: obtaining first SR content for a first time period of the video content associated with the first scene; obtaining a task associated with the first scene; and causing presentation of the first SR content and a first indication of the task associated with the first scene; and if the video content includes a second scene when the user input was detected: obtaining second SR content for a second time period of the video content associated with the second scene; obtaining a task associated with the second scene; and causing presentation of the second SR content and a second indication of the task associated with the second scene.

23 Claims, 12 Drawing Sheets



Related U.S. Application Data

(60) Provisional application No. 62/734,050, filed on Sep. 20, 2018, provisional application No. 62/620,326, filed on Jan. 22, 2018.

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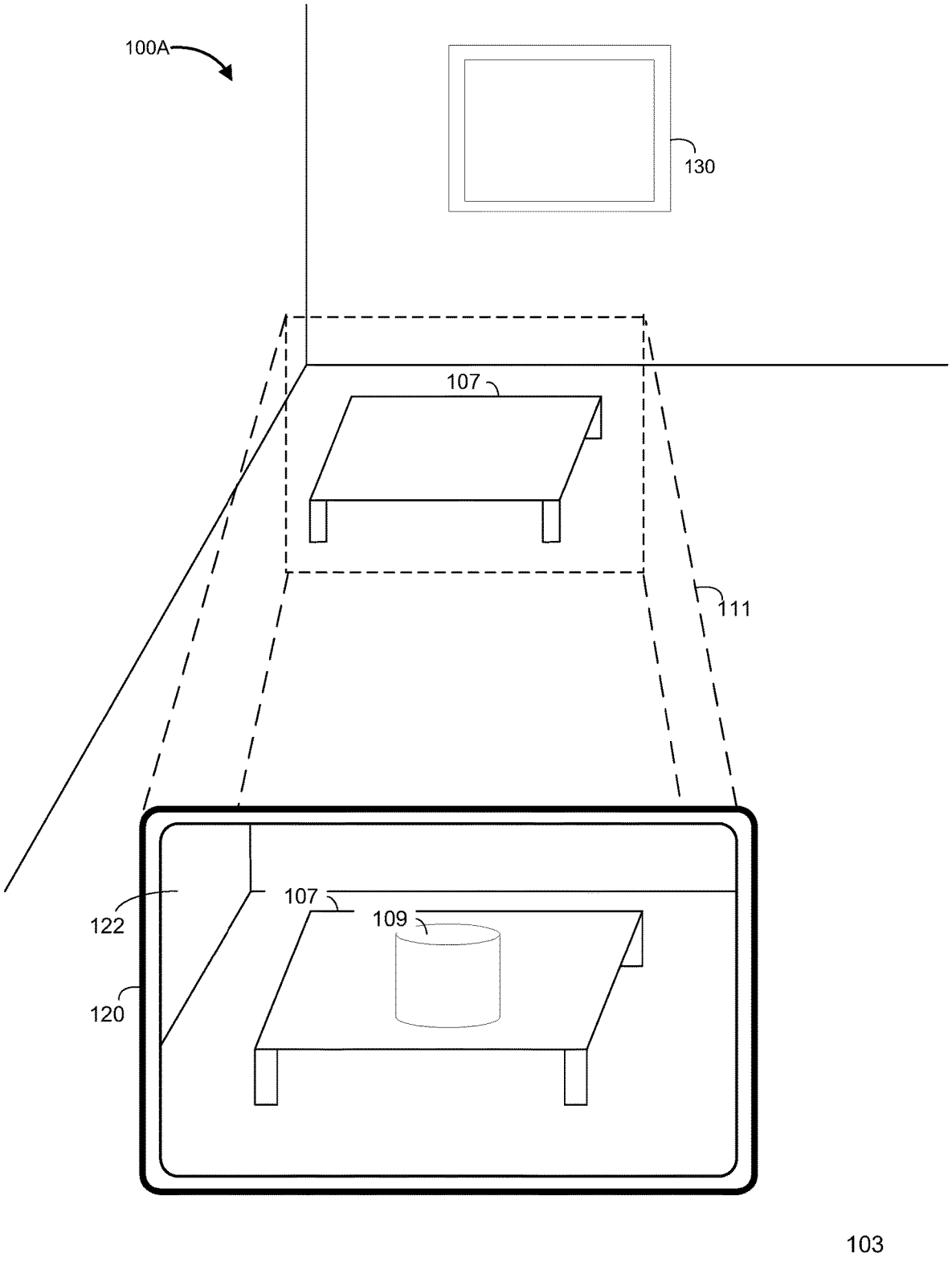


Figure 1A

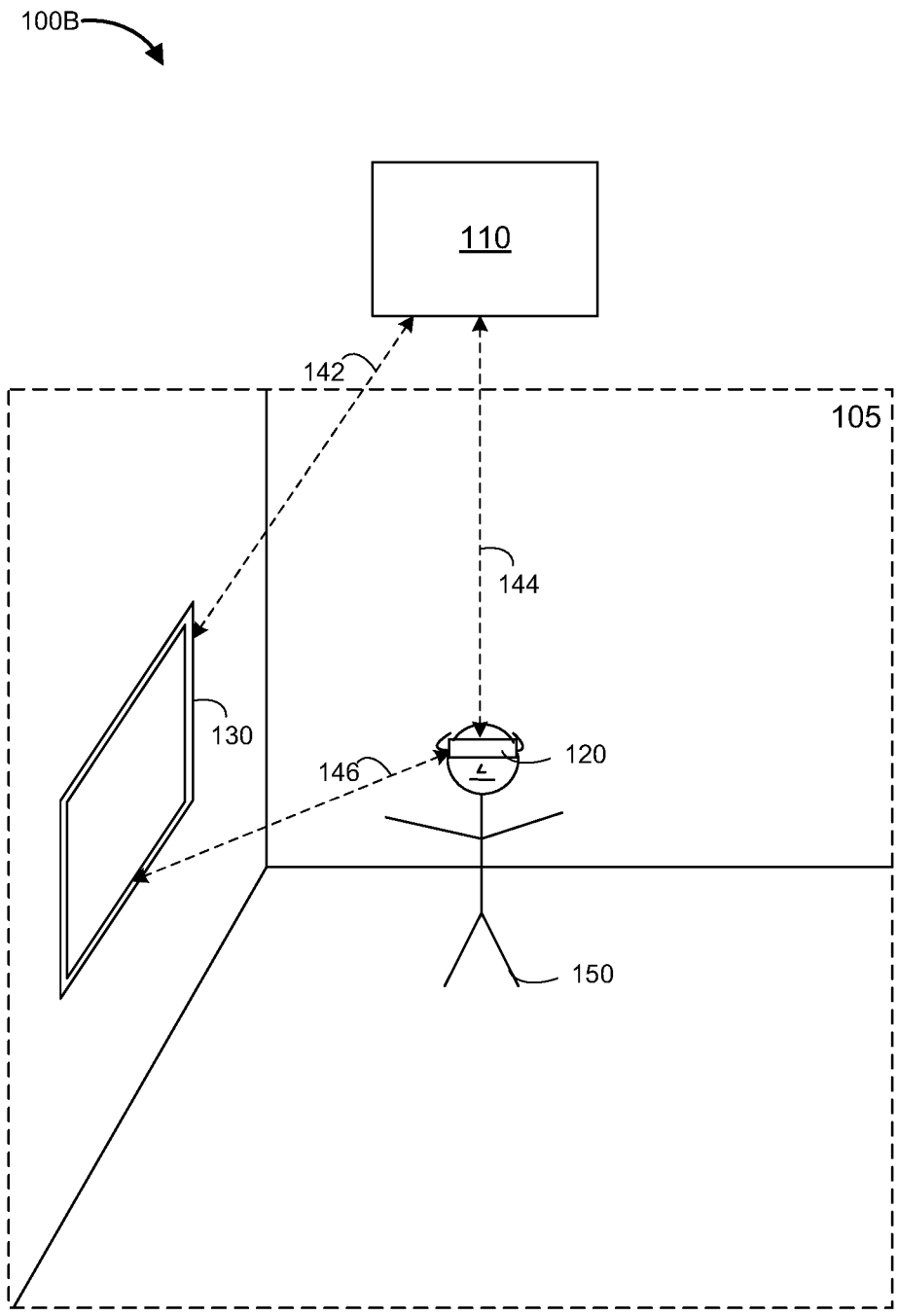


Figure 1B

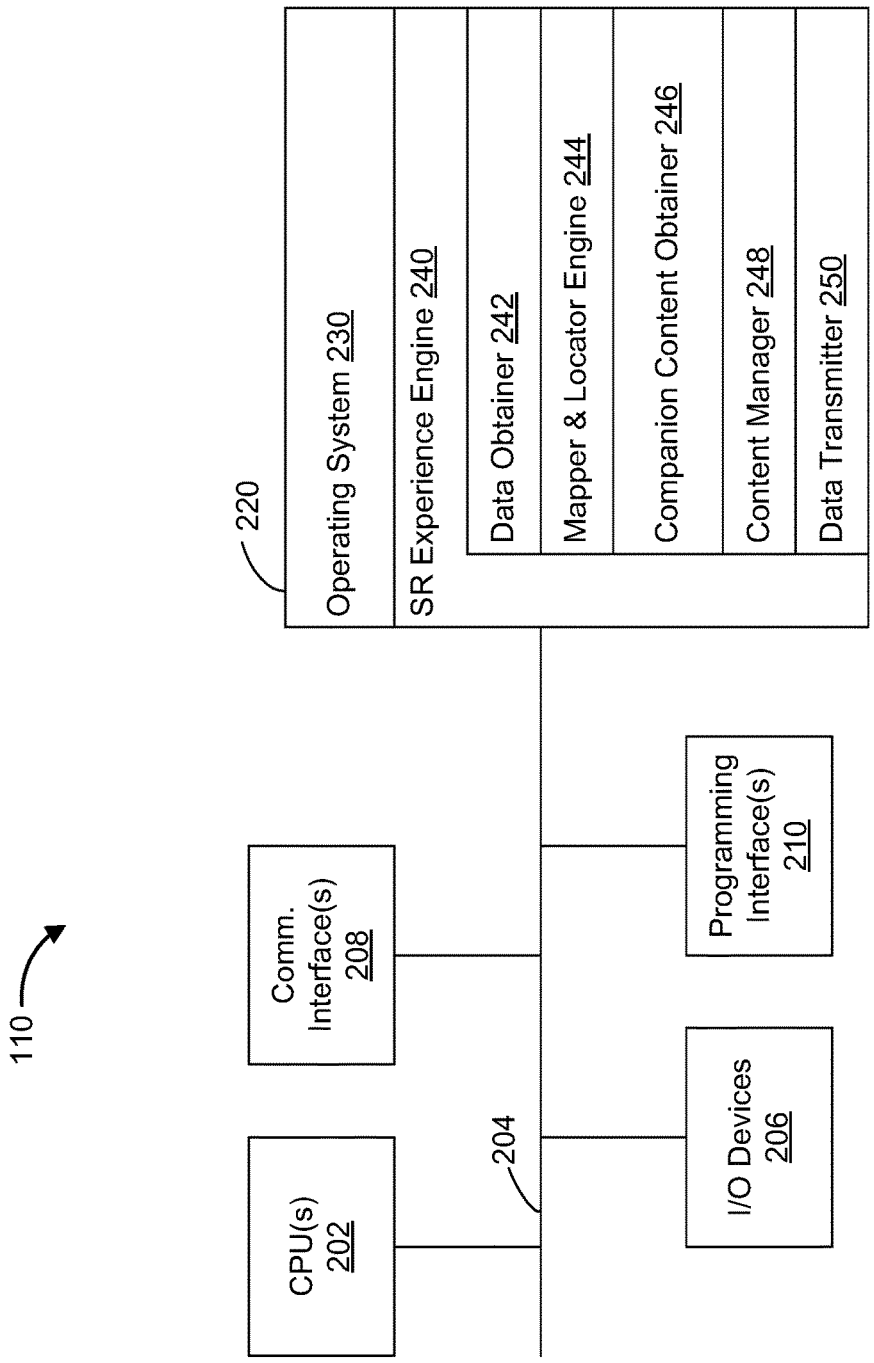

110
220
Operating System 230
SR Experience Engine 240
Data Obtainer 242
Mapper & Locator Engine 244
Companion Content Obtainer 246
Content Manager 248
Data Transmitter 250
Comm. Interface(s) 208
Programming Interface(s) 210
CPU(s) 202
204
I/O Devices 206

Figure 2

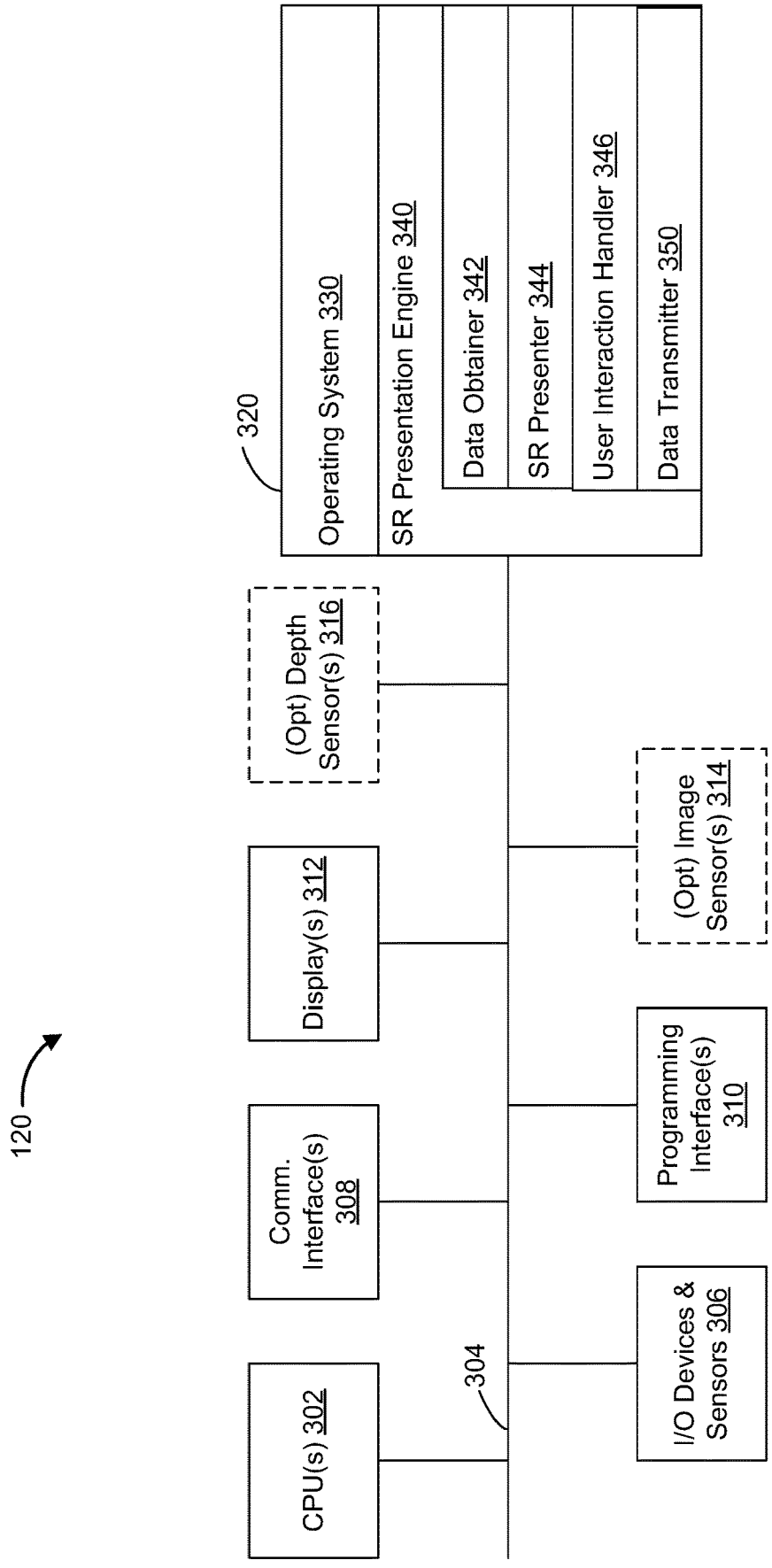

120
320
Operating System 330
SR Presentation Engine 340
Data Obtainer 342
SR Presenter 344
User Interaction Handler 346
Data Transmitter 350
(Opt) Depth Sensor(s) 316
Display(s) 312
(Opt) Image Sensor(s) 314
Comm. Interface(s) 308
Programming Interface(s) 310
CPU(s) 302
304
I/O Devices & Sensors 306

Figure 3

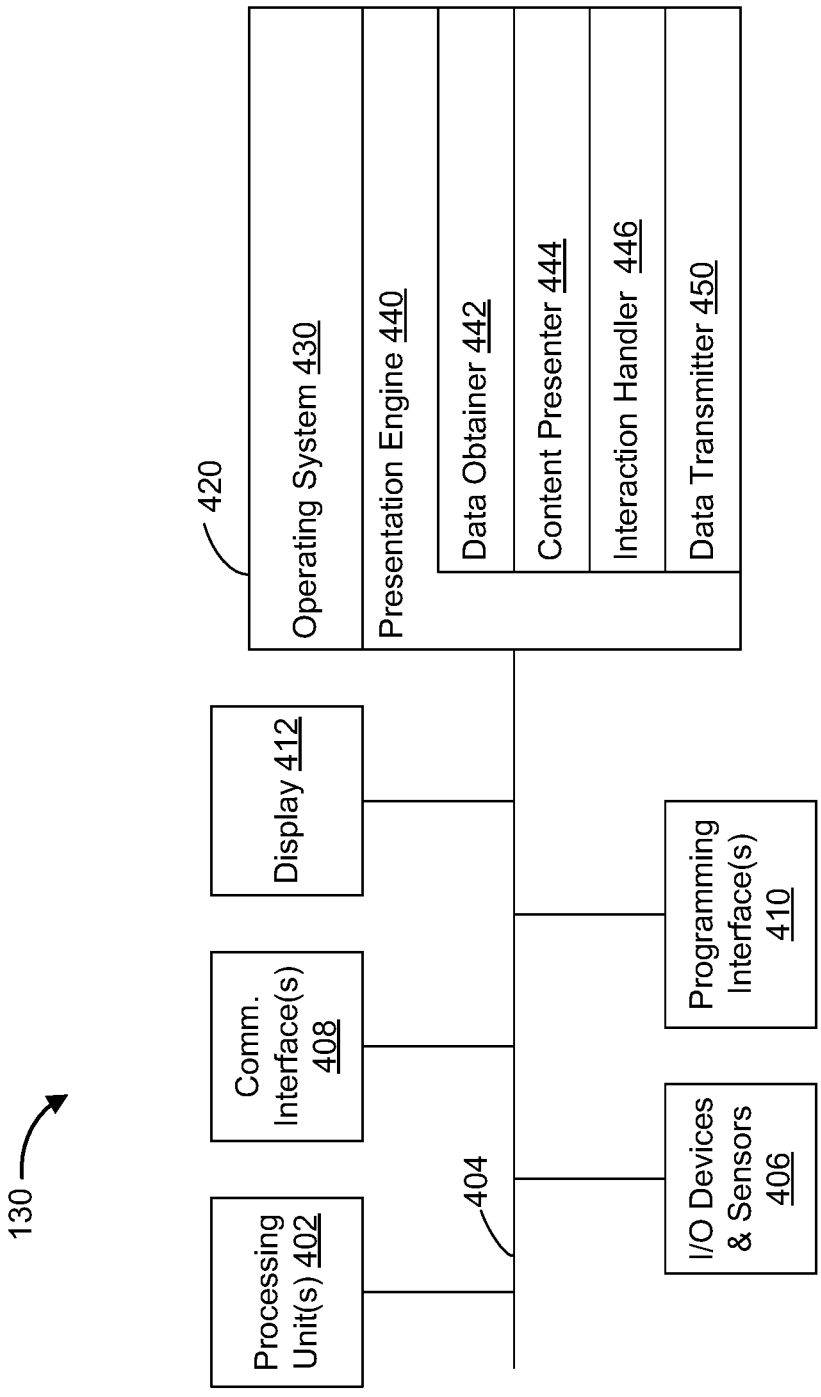
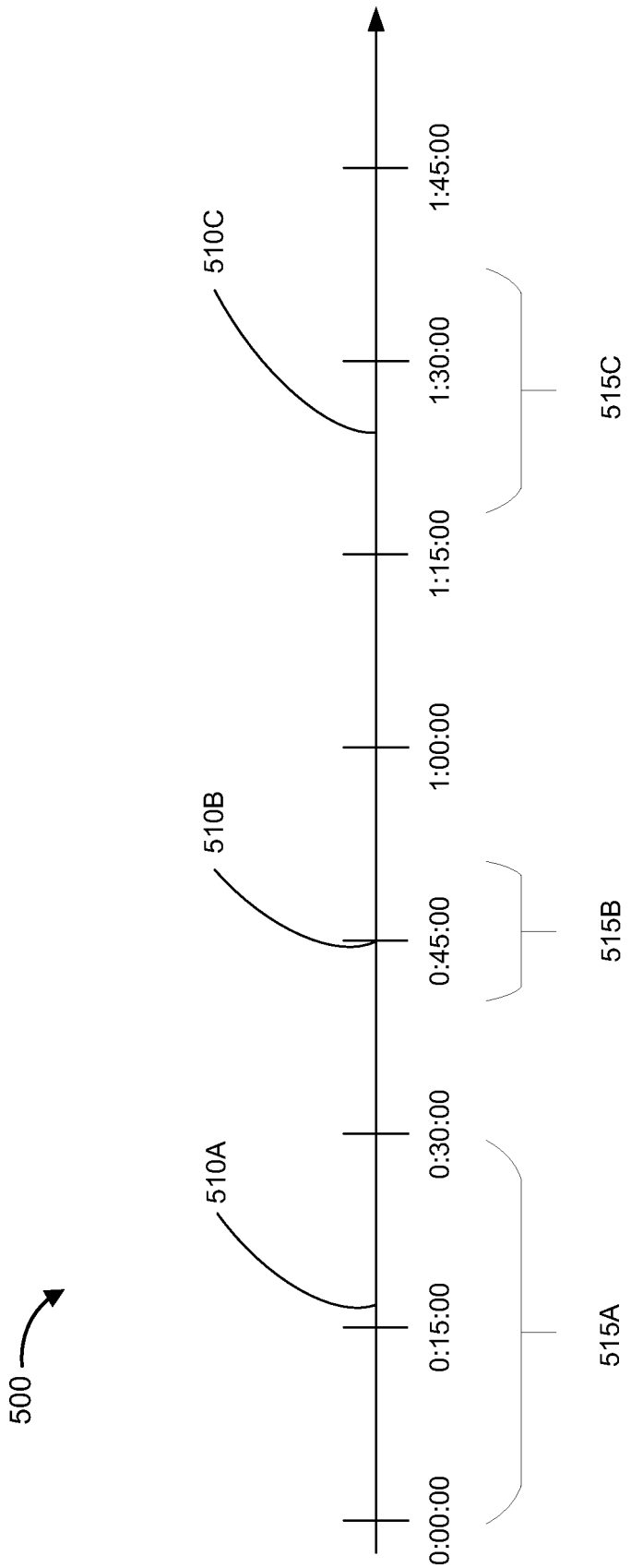

130
420
Operating System 430
Presentation Engine 440
Data Obtainer 442
Content Presenter 444
Interaction Handler 446
Data Transmitter 450
Display 412
Comm. Interface(s) 408
Processing Unit(s) 402
404
I/O Devices & Sensors 406
Programming Interface(s) 410

Figure 4


500
0:00:00
0:15:00
0:30:00
0:45:00
1:00:00
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510A
510B
510C
515A
515B
515C

Figure 5

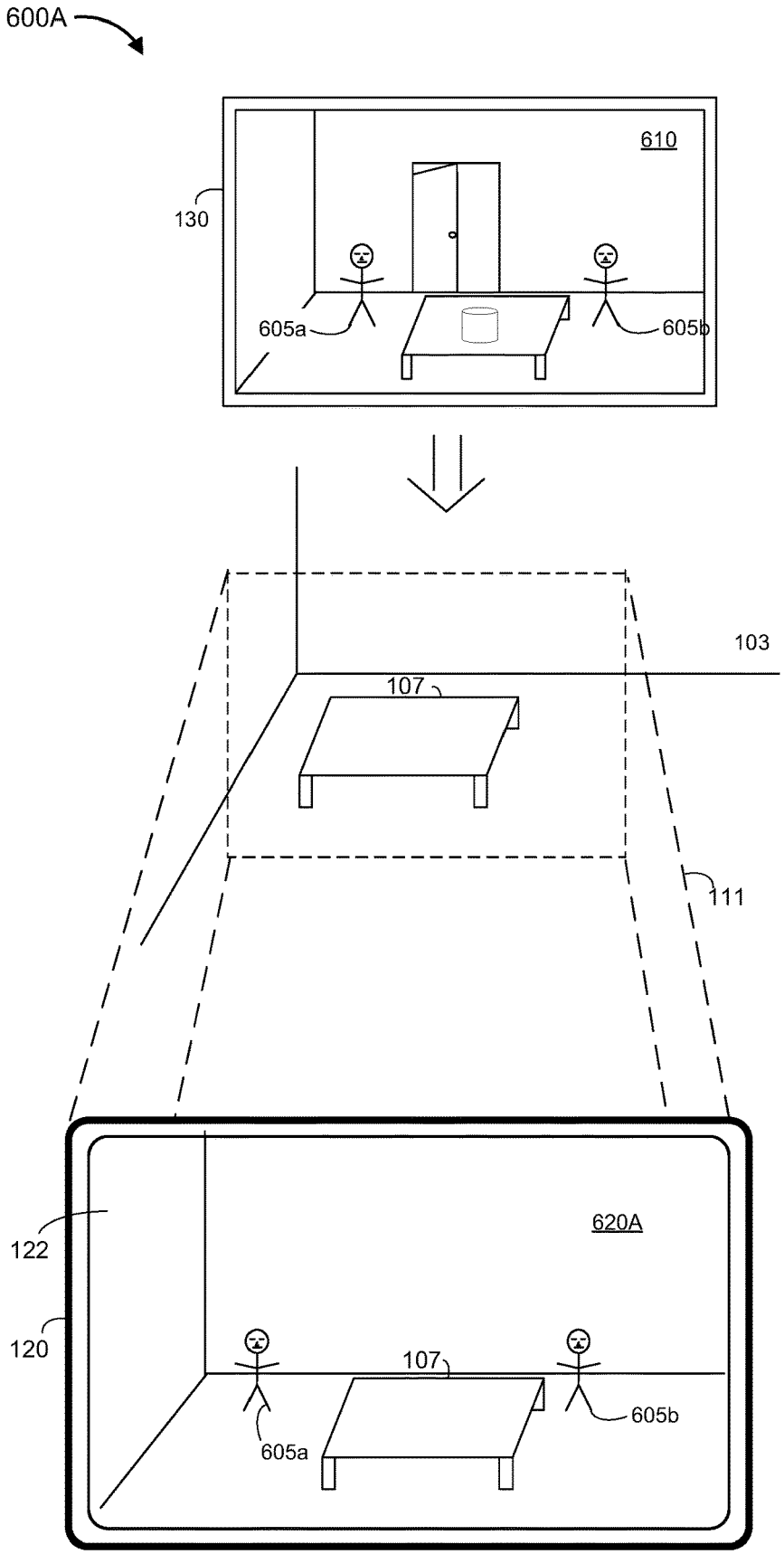

Figure 6A

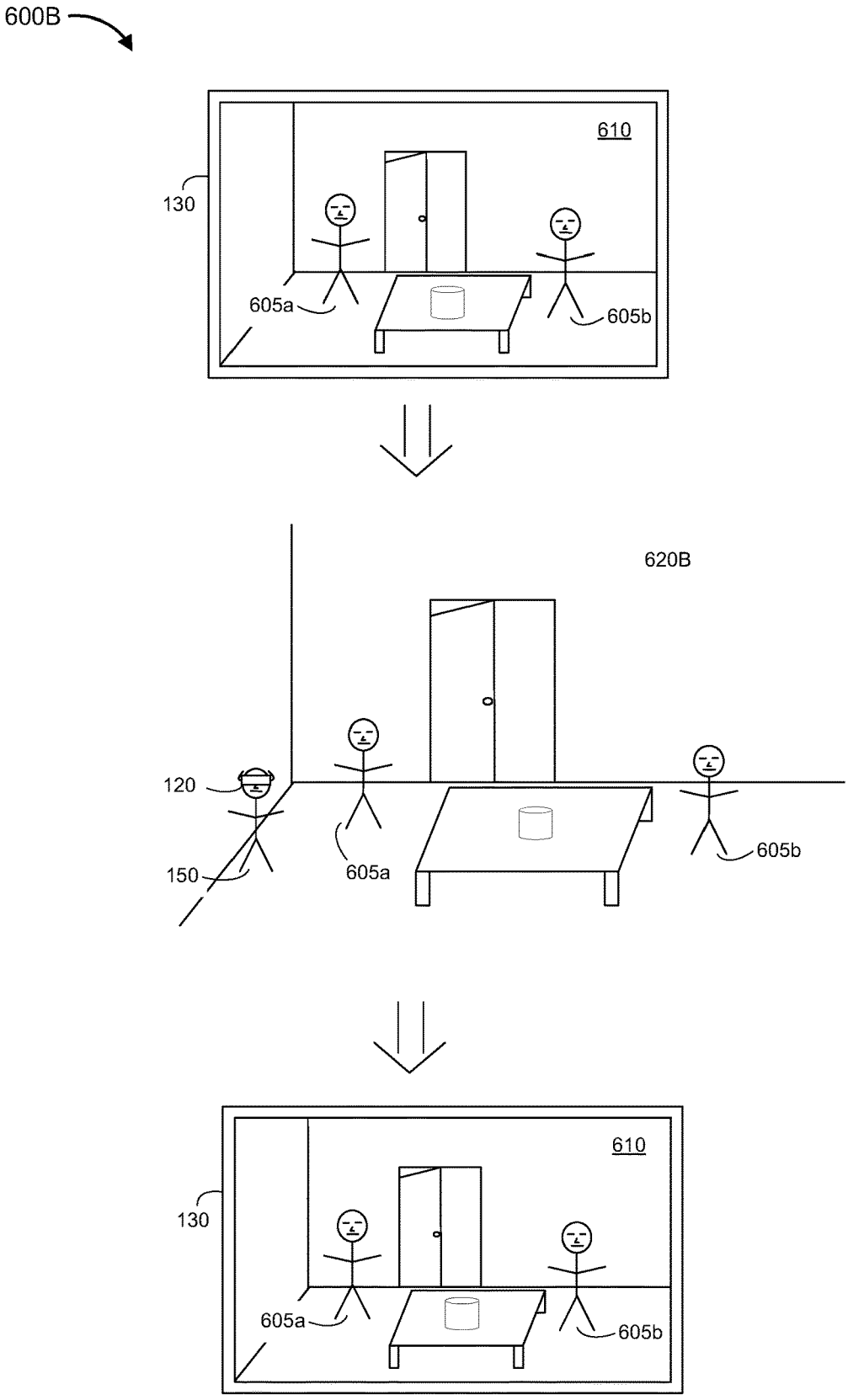
600B
610
130
605a
605b
620B
120
150
605a
605b
610
130
605a
605b

Figure 6B

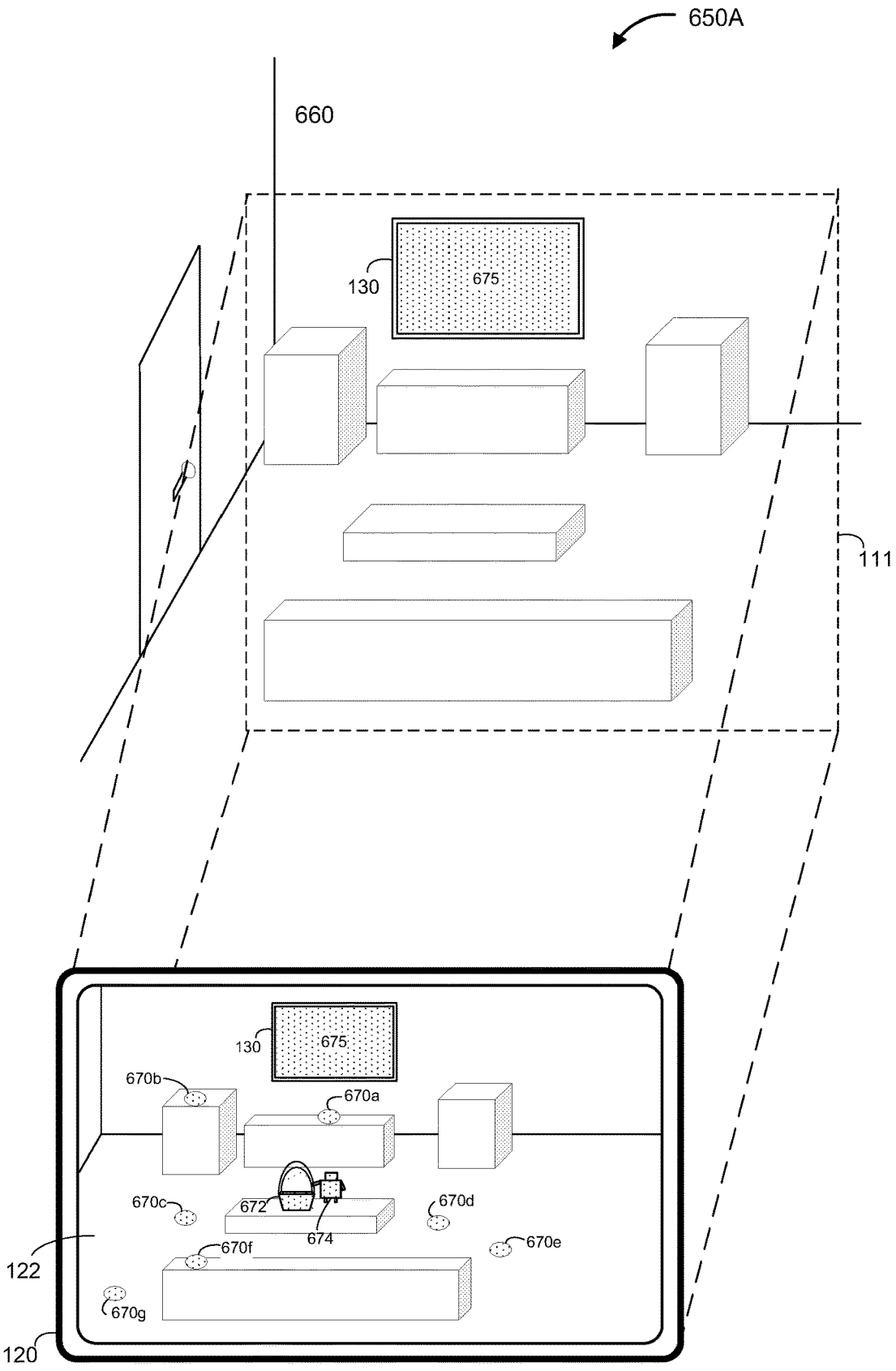
650A
660
130
675
111
130
675
670b
670a
670c
672
674
670d
670e
670f
670g
122
120

Figure 6C

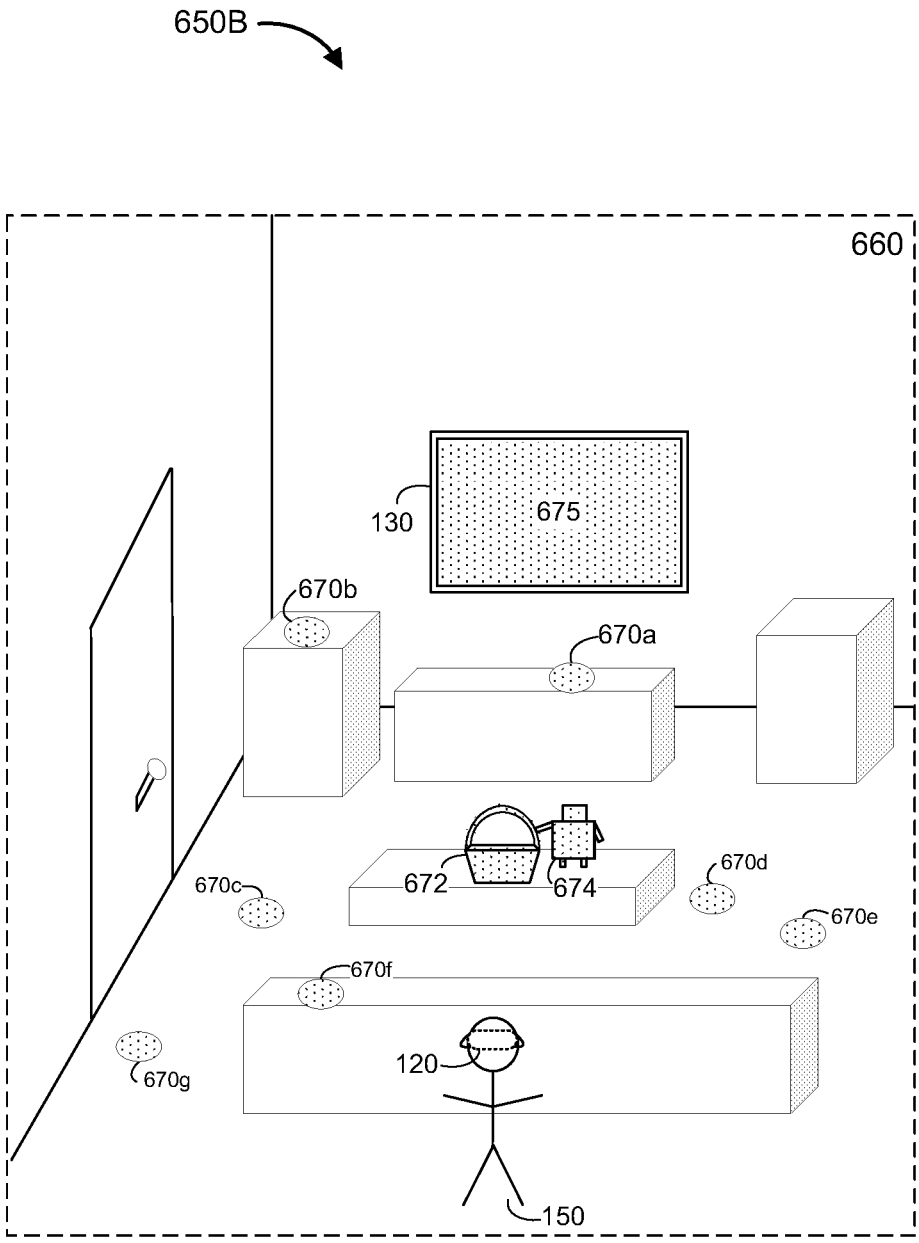
650B
660
130
675
670b
670a
672
674
670c
670d
670e
670f
670g
120
150

Figure 6D

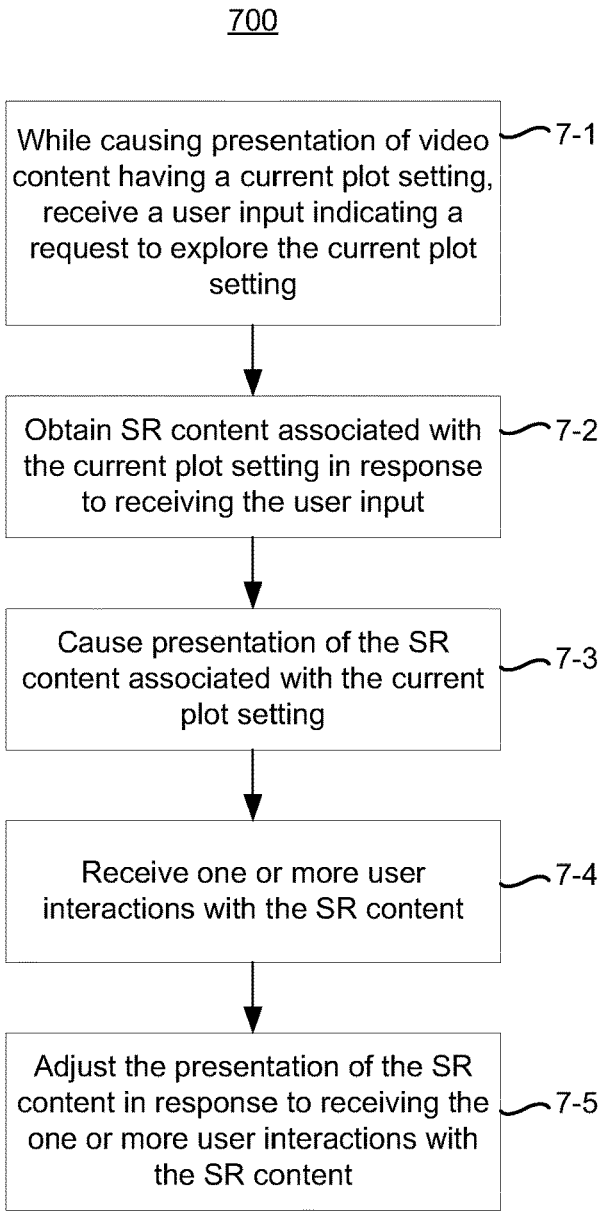
700
While causing presentation of video content having a current plot setting, receive a user input indicating a request to explore the current plot setting
7-1
Obtain SR content associated with the current plot setting in response to receiving the user input
7-2
Cause presentation of the SR content associated with the current plot setting
7-3
Receive one or more user interactions with the SR content
7-4
Adjust the presentation of the SR content in response to receiving the one or more user interactions with the SR content
7-5

Figure 7

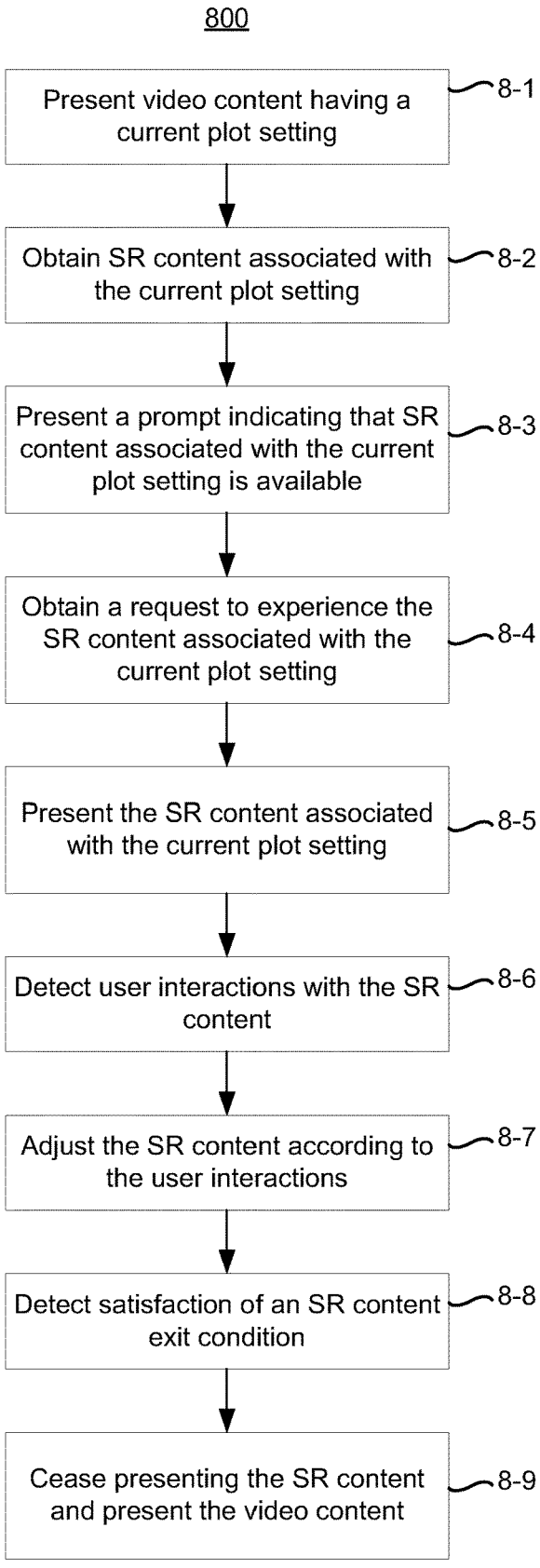
800
Present video content having a current plot setting
8-1
Obtain SR content associated with the current plot setting
8-2
Present a prompt indicating that SR content associated with the current plot setting is available
8-3
Obtain a request to experience the SR content associated with the current plot setting
8-4
Present the SR content associated with the current plot setting
8-5
Detect user interactions with the SR content
8-6
Adjust the SR content according to the user interactions
8-7
Detect satisfaction of an SR content exit condition
8-8
Cease presenting the SR content and present the video content
8-9

Figure 8

METHOD AND DEVICE FOR PRESENTING SYNTHESIZED REALITY COMPANION CONTENT

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority to U.S. provisional patent application No. 62/620,326, filed on Jan. 22, 2018, U.S. provisional patent application No. 62/734,050, filed on Sep. 20, 2018, International patent application number PCT/US2019/014225, filed on Jan. 18, 2019, and U.S. non-provisional patent application Ser. No. 16/963,308, filed on Jul. 20, 2020, which are hereby incorporated by reference in their entireties.

TECHNICAL FIELD

The present disclosure generally relates to synthesized reality (SR) content consumption, and in particular, to systems, methods, and devices for presenting SR companion content.

BACKGROUND

Virtual reality (VR) and augmented reality (AR) are becoming more popular due to their remarkable ability to alter a user's perception of the world. For example, VR and AR are used for learning purposes, gaming purposes, content creation purposes, social media and interaction purposes, or the like. These technologies differ in the user's perception of his/her presence. VR transposes the user into a virtual space so their VR perception is different from his/her real-world perception. In contrast, AR takes the user's real-world perception and adds something to it.

These technologies are becoming more commonplace due to, for example, miniaturization of hardware components, improvements to hardware performance, and improvements to software efficiency. As one example, a user may experience AR content superimposed on a live video feed of the user's setting on a handheld display (e.g., an AR-enabled mobile phone or tablet with video pass-through). As another example, a user may experience AR content by wearing a head-mounted device (HMD) or head-mounted enclosure that still allows the user to see his/her surroundings (e.g., glasses with optical see-through). As yet another example, a user may experience VR content by using an HMD that encloses the user's field-of-view and is tethered to a computer.

BRIEF DESCRIPTION OF THE DRAWINGS

So that the present disclosure can be understood by those of ordinary skill in the art, a more detailed description may be had by reference to aspects of some illustrative implementations, some of which are shown in the accompanying drawings.

FIG. **1**A is a block diagram of an example operating architecture in accordance with some implementations.

FIG. **1**B is a block diagram of another example operating architecture in accordance with some implementations.

FIG. **2** is a block diagram of an example controller in accordance with some implementations.

FIG. **3** is a block diagram of an example electronic device in accordance with some implementations.

FIG. **4** is a block diagram of an example display device in accordance with some implementations.

FIG. **5** illustrates an example content timeline in accordance with some implementations.

FIGS. **6**A-**6**D illustrate example playback scenarios in accordance with some implementations.

FIG. **7** is a flowchart representation of a method of presenting SR companion content in accordance with some implementations.

FIG. **8** is a flowchart representation of a method of presenting SR companion content in accordance with some implementations.

In accordance with common practice the various features illustrated in the drawings may not be drawn to scale. Accordingly, the dimensions of the various features may be arbitrarily expanded or reduced for clarity. In addition, some of the drawings may not depict all of the components of a given system, method or device. Finally, like reference numerals may be used to denote like features throughout the specification and figures.

SUMMARY

Various implementations disclosed herein include devices, systems, and methods for presenting synthesized reality (SR) companion content. According to some implementations, the method is performed at a device including non-transitory memory and one or more processors coupled with the non-transitory memory. The method includes: while causing presentation of video content having a current plot setting, receiving a user input indicating a request to explore the current plot setting; obtaining SR content associated with the current plot setting in response to receiving the user input; causing presentation of the SR content associated with the current plot setting; receiving one or more user interactions with the SR content; and adjusting the presentation of the SR content in response to receiving the one or more user interactions with the SR content.

In accordance with some implementations, a device includes one or more processors, a non-transitory memory, and one or more programs; the one or more programs are stored in the non-transitory memory and configured to be executed by the one or more processors and the one or more programs include instructions for performing or causing performance of any of the methods described herein. In accordance with some implementations, a non-transitory computer readable storage medium has stored therein instructions, which, when executed by one or more processors of a device, cause the device to perform or cause performance of any of the methods described herein. In accordance with some implementations, a device includes: one or more processors, a non-transitory memory, and means for performing or causing performance of any of the methods described herein.

DESCRIPTION

Numerous details are described in order to provide a thorough understanding of the example implementations shown in the drawings. However, the drawings merely show some example aspects of the present disclosure and are therefore not to be considered limiting. Those of ordinary skill in the art will appreciate that other effective aspects and/or variants do not include all of the specific details described herein. Moreover, well-known systems, methods, components, devices and circuits have not been described in exhaustive detail so as not to obscure more pertinent aspects of the example implementations described herein.

A physical setting refers to a world that individuals can sense and/or with which individuals can interact without assistance of electronic systems. Physical settings (e.g., a physical forest) include physical elements (e.g., physical trees, physical structures, and physical animals). Individuals can directly interact with and/or sense the physical setting, such as through touch, sight, smell, hearing, and taste.

In contrast, a synthesized reality (SR) setting refers to an entirely or partly computer-created setting that individuals can sense and/or with which individuals can interact via an electronic system. In SR, a subset of an individual's movements is monitored, and, responsive thereto, one or more attributes of one or more virtual objects in the SR setting is changed in a manner that conforms with one or more physical laws. For example, a SR system may detect an individual walking a few paces forward and, responsive thereto, adjust graphics and audio presented to the individual in a manner similar to how such scenery and sounds would change in a physical setting. Modifications to attribute(s) of virtual object(s) in a SR setting also may be made responsive to representations of movement (e.g., audio instructions).

An individual may interact with and/or sense a SR object using any one of his senses, including touch, smell, sight, taste, and sound. For example, an individual may interact with and/or sense aural objects that create a multi-dimensional (e.g., three dimensional) or spatial aural setting, and/or enable aural transparency. Multi-dimensional or spatial aural settings provide an individual with a perception of discrete aural sources in multi-dimensional space. Aural transparency selectively incorporates sounds from the physical setting, either with or without computer-created audio. In some SR settings, an individual may interact with and/or sense only aural objects.

One example of SR is virtual reality (VR). A VR setting refers to a simulated setting that is designed only to include computer-created sensory inputs for at least one of the senses. A VR setting includes multiple virtual objects with which an individual may interact and/or sense. An individual may interact and/or sense virtual objects in the VR setting through a simulation of a subset of the individual's actions within the computer-created setting, and/or through a simulation of the individual or his presence within the computer-created setting.

Another example of SR is mixed reality (MR). A MR setting refers to a simulated setting that is designed to integrate computer-created sensory inputs (e.g., virtual objects) with sensory inputs from the physical setting, or a representation thereof. On a reality spectrum, a mixed reality setting is between, and does not include, a VR setting at one end and an entirely physical setting at the other end.

In some MR settings, computer-created sensory inputs may adapt to changes in sensory inputs from the physical setting. Also, some electronic systems for presenting MR settings may monitor orientation and/or location with respect to the physical setting to enable interaction between virtual objects and real objects (which are physical elements from the physical setting or representations thereof). For example, a system may monitor movements so that a virtual plant appears stationery with respect to a physical building.

One example of mixed reality is augmented reality (AR). An AR setting refers to a simulated setting in which at least one virtual object is superimposed over a physical setting, or a representation thereof. For example, an electronic system may have an opaque display and at least one imaging sensor for capturing images or video of the physical setting, which are representations of the physical setting. The system combines the images or video with virtual objects, and displays the combination on the opaque display. An individual, using the system, views the physical setting indirectly via the images or video of the physical setting, and observes the virtual objects superimposed over the physical setting. When a system uses image sensor(s) to capture images of the physical setting, and presents the AR setting on the opaque display using those images, the displayed images are called a video pass-through. Alternatively, an electronic system for displaying an AR setting may have a transparent or semi-transparent display through which an individual may view the physical setting directly. The system may display virtual objects on the transparent or semi-transparent display, so that an individual, using the system, observes the virtual objects superimposed over the physical setting. In another example, a system may comprise a projection system that projects virtual objects into the physical setting. The virtual objects may be projected, for example, on a physical surface or as a holograph, so that an individual, using the system, observes the virtual objects superimposed over the physical setting.

An augmented reality setting also may refer to a simulated setting in which a representation of a physical setting is altered by computer-created sensory information. For example, a portion of a representation of a physical setting may be graphically altered (e.g., enlarged), such that the altered portion may still be representative of but not a faithfully-reproduced version of the originally captured image(s). As another example, in providing video pass-through, a system may alter at least one of the sensor images to impose a particular viewpoint different than the viewpoint captured by the image sensor(s). As an additional example, a representation of a physical setting may be altered by graphically obscuring or excluding portions thereof.

Another example of mixed reality is augmented virtuality (AV). An AV setting refers to a simulated setting in which a computer-created or virtual setting incorporates at least one sensory input from the physical setting. The sensory input(s) from the physical setting may be representations of at least one characteristic of the physical setting. For example, a virtual object may assume a color of a physical element captured by imaging sensor(s). In another example, a virtual object may exhibit characteristics consistent with actual weather conditions in the physical setting, as identified via imaging, weather-related sensors, and/or online weather data. In yet another example, an augmented reality forest may have virtual trees and structures, but the animals may have features that are accurately reproduced from images taken of physical animals.

Many electronic systems enable an individual to interact with and/or sense various SR settings. One example includes head mounted systems. A head mounted system may have an opaque display and speaker(s). Alternatively, a head mounted system may be designed to receive an external display (e.g., a smartphone). The head mounted system may have imaging sensor(s) and/or microphones for taking images/video and/or capturing audio of the physical setting, respectively. A head mounted system also may have a transparent or semi-transparent display. The transparent or semi-transparent display may incorporate a substrate through which light representative of images is directed to an individual's eyes. The display may incorporate LEDs, OLEDs, a digital light projector, a laser scanning light source, liquid crystal on silicon, or any combination of these technologies. The substrate through which the light is transmitted may be a light waveguide, optical combiner, optical reflector, holographic substrate, or any combination of these substrates. In one embodiment, the transparent or semi-

transparent display may transition selectively between an opaque state and a transparent or semi-transparent state. In another example, the electronic system may be a projection-based system. A projection-based system may use retinal projection to project images onto an individual's retina. Alternatively, a projection system also may project virtual objects into a physical setting (e.g., onto a physical surface or as a holograph). Other examples of SR systems include heads up displays, automotive windshields with the ability to display graphics, windows with the ability to display graphics, lenses with the ability to display graphics, headphones or earphones, speaker arrangements, input mechanisms (e.g., controllers having or not having haptic feedback), tablets, smartphones, and desktop or laptop computers.

While a user is watching a television (TV) episode or movie, he/she may wish to explore the current plot setting as an SR experience. However, SR content associated with the TV episode or movie may be unavailable or separate from the flat video content (e.g., a 2-dimensional or "flat" AVI, FLV, WMV, MOV, MP4, or the like file type). As such, the disclosed invention allows the user to seamlessly experience SR companion content while watching flat video content. According to some implementations, while watching the flat video content a subtle affordance or notification indicates that SR companion content associated with a current plot setting in the flat video content is available for the user to enter and/or explore. As such, the user transitions from watching the flat video content to an SR experience without having to separately search for and/or load the SR content and vice versa.

As one example, that SR companion content enables the user to inspect objects in the plot setting, fight villains, question characters in the plot setting, open doors and explore adjacent rooms, locomote within the plot setting, and/or the like. As another example, that SR companion content includes a task or mission associated with the plot setting for the user to perform in order to drive the plot forward such as retrieving an item associated with the plot setting or clearing a path in the plot setting of bad guys or debris for the protagonist of the video content. As yet another example, the SR companion content includes an educational aide or auxiliary information associated the video content such as an AR version of the Ho Chi Minh Trail or an AR battlefield map showing the location of military battalions while watching a documentary on the Vietnam War. As yet another example, the SR companion content leverages the user's current environs when providing a task for the user to perform in order to drive the plot forward such as collecting AR candies scattered around the user's living room to give to a protagonist in the video content.

FIG. **1**A is a block diagram of an example operating architecture **100**A in accordance with some implementations. While pertinent features are shown, those of ordinary skill in the art will appreciate from the present disclosure that various other features have not been illustrated for the sake of brevity and so as not to obscure more pertinent aspects of the example implementations disclosed herein. To that end, as a non-limiting example, the operating architecture **100**A includes an electronic device **120** and an optional display device **130**.

In some implementations, the electronic device **120** is configured to present the SR experience to a user. In some implementations, the electronic device **120** includes a suitable combination of software, firmware, and/or hardware. The electronic device **120** is described in greater detail below with respect to FIG. **3**. According to some implementations, the electronic device **120** presents, via a display **122**, a synthesized reality (SR) experience to the user while the user is physically present within a physical setting **103** that includes a table **107** within the field-of-view **111** of the electronic device **120**. As such, in some implementations, the user holds the electronic device **120** in his/her hand(s). In some implementations, while presenting an augmented reality (AR) experience, the electronic device **120** is configured to present AR content (e.g., an AR cylinder **109**) and to enable video pass-through of the physical setting **103** (e.g., including the table **107**) on a display **122**.

In some implementations, the display device **130** is configured to present media content (e.g., video and/or audio content) to the user. In some implementations, the display device **130** corresponds to a television or a computing device such as a desktop computer, kiosk, laptop computer, tablet, mobile phone, wearable computing device, or the like. In some implementations, the display device **130** includes a suitable combination of software, firmware, and/or hardware. The display device **130** is described in greater detail below with respect to FIG. **4**.

FIG. **1**B is a block diagram of an example operating architecture **100**B in accordance with some implementations. While pertinent features are shown, those of ordinary skill in the art will appreciate from the present disclosure that various other features have not been illustrated for the sake of brevity and so as not to obscure more pertinent aspects of the example implementations disclosed herein. To that end, as a non-limiting example, the operating architecture **100**B includes a controller **110**, an electronic device **120**, and an optional display device **130**.

In some implementations, the controller **110** is configured to manage and coordinate an SR experience for the user. In some implementations, the controller **110** includes a suitable combination of software, firmware, and/or hardware. The controller **110** is described in greater detail below with respect to FIG. **2**. In some implementations, the controller **110** is a computing device that is local or remote relative to the physical setting **105**. For example, the controller **110** is a local server located within the physical setting **105**. In another example, the controller **110** is a remote server located outside of the physical setting **105** (e.g., a cloud server, central server, etc.).

In some implementations, the controller **110** is communicatively coupled with the electronic device **120** via one or more wired or wireless communication channels **144** (e.g., BLUETOOTH, IEEE 802.11x, IEEE 802.16x, IEEE 802.3x, etc.). In some implementations, the controller **110** is communicatively coupled with the display device **130** via one or more wired or wireless communication channels **142** (e.g., BLUETOOTH, IEEE 802.11x, IEEE 802.16x, IEEE 802.3x, etc.). In some implementations, the electronic device **120** is communicatively coupled with the display device **130** via one or more wired or wireless communication channels **146** (e.g., BLUETOOTH, IEEE 802.11x, IEEE 802.16x, IEEE 802.3x, etc.).

In some implementations, the electronic device **120** is configured to present the SR experience to the user **150**. In some implementations, the electronic device **120** includes a suitable combination of software, firmware, and/or hardware. The electronic device **120** is described in greater detail below with respect to FIG. **3**. In some implementations, the functionalities of the controller **110** and/or the display device **130** are provided by and/or combined with the electronic device **120**.

According to some implementations, the electronic device **120** presents a synthesized reality (SR) experience to the user **150** while the user **150** is virtually and/or physically present within a physical setting **105**. In some implementations, while presenting an augmented reality (AR) experience, the electronic device **120** is configured to present AR content and to enable optical see-through of the physical setting **105**. In some implementations, while presenting a virtual reality (VR) experience, the electronic device **120** is configured to present VR content and to optionally enable video pass-through of the physical setting **105**.

In some implementations, the user **150** wears the electronic device **120** on his/her head such as a head-mounted device (HMD). As such, the electronic device **120** includes one or more displays provided to display the SR content. For example, the electronic device **120** encloses the field-of-view of the user **150**. As another example, the electronic device **120** slides into or otherwise attaches to a head mounted enclosure. In some implementations, the electronic device **120** is replaced with an SR chamber, enclosure, or room configured to present SR content in which the user **150** does not wear the electronic device **120**.

In some implementations, the display device **130** is configured to present media content (e.g., video and/or audio content) to the user **150**. In some implementations, the display device **130** corresponds to a television or a computing device such as a desktop computer, kiosk, laptop computer, tablet, mobile phone, wearable computing device, or the like. In some implementations, the display device **130** includes a suitable combination of software, firmware, and/or hardware. The display device **130** is described in greater detail below with respect to FIG. **4**.

FIG. **2** is a block diagram of an example of the controller **110** in accordance with some implementations. While certain specific features are illustrated, those skilled in the art will appreciate from the present disclosure that various other features have not been illustrated for the sake of brevity, and so as not to obscure more pertinent aspects of the implementations disclosed herein. To that end, as a non-limiting example, in some implementations, the controller **110** includes one or more processing units **202** (e.g., microprocessors, application-specific integrated-circuits (ASICs), field-programmable gate arrays (FPGAs), graphics processing units (GPUs), central processing units (CPUs), processing cores, and/or the like), one or more input/output (I/O) devices **206**, one or more communication interfaces **208** (e.g., universal serial bus (USB), IEEE 802.3x, IEEE 802.11x, IEEE 802.16x, global system for mobile communications (GSM), code division multiple access (CDMA), time division multiple access (TDMA), global positioning system (GPS), infrared (IR), BLUETOOTH, ZIGBEE, and/or the like type interface), one or more programming (e.g., I/O) interfaces **210**, a memory **220**, and one or more communication buses **204** for interconnecting these and various other components.

In some implementations, the one or more communication buses **204** include circuitry that interconnects and controls communications between system components. In some implementations, the one or more I/O devices **206** include at least one of a keyboard, a mouse, a touchpad, a joystick, one or more microphones, one or more speakers, one or more image sensors, one or more displays, and/or the like.

The memory **220** includes high-speed random-access memory, such as dynamic random-access memory (DRAM), static random-access memory (SRAM), double-data-rate random-access memory (DDR RAM), or other random-access solid-state memory devices. In some implementations, the memory **220** includes non-volatile memory, such as one or more magnetic disk storage devices, optical disk storage devices, flash memory devices, or other non-volatile solid-state storage devices. The memory **220** optionally includes one or more storage devices remotely located from the one or more processing units **202**. The memory **220** comprises a non-transitory computer readable storage medium. In some implementations, the memory **220** or the non-transitory computer readable storage medium of the memory **220** stores the following programs, modules and data structures, or a subset thereof including an optional operating system **230** and a synthesized reality (SR) experience engine **240**.

The operating system **230** includes procedures for handling various basic system services and for performing hardware dependent tasks. In some implementations, the SR experience engine **240** is configured to manage and coordinate one or more SR experiences for one or more users (e.g., a single SR experience for one or more users, or multiple SR experiences for respective groups of one or more users). To that end, in various implementations, the SR experience engine **240** includes a data obtainer **242**, a tracker and locator engine **244**, a companion content obtainer **246**, a content management unit **248**, and a data transmitter **250**.

In some implementations, the data obtainer **242** is configured to obtain data (e.g., presentation data, user interaction data, sensor data, location data, etc.) from at least one of sensors in the physical setting **105**, sensors associated with the controller **110**, the electronic device **120**, and the display device **130**. To that end, in various implementations, the data obtainer **242** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the tracker and locator engine **244** is configured to map the physical setting **105** and to track the position/location of at least one of the electronic device **120** and the display device **130** with respect to the physical setting **105**. To that end, in various implementations, the tracker and locator engine **244** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the companion content obtainer **246** is configured to obtain (e.g., receive, retrieve, or generate) SR content (e.g., companion content correlated with the video content) associated with the video content presented to the user via the display device **130**. To that end, in various implementations, the companion content obtainer **246** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the content management unit **248** is configured to manage and coordinate the video content (e.g., presented to the user via the display device **130**) and the SR content associated with the video content (e.g., presented to the user by the electronic device **120**). To that end, in various implementations, the content management unit **248** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the data transmitter **250** is configured to transmit data (e.g., presentation data, location data, etc.) to at least one of the electronic device **120** and the display device **130**. To that end, in various implementations, the data transmitter **250** includes instructions and/or logic therefor, and heuristics and metadata therefor.

Although the data obtainer **242**, the tracker and locator engine **244**, the companion content obtainer **246**, the content management unit **248**, and the data transmitter **250** are shown as residing on a single device (e.g., the controller

110), it should be understood that in other implementations, any combination of the data obtainer **242**, the tracker and locator engine **244**, the companion content obtainer **246**, the content management unit **248**, and the data transmitter **250** may be located in separate computing devices.

Moreover, FIG. **2** is intended more as a functional description of the various features which are present in a particular embodiment as opposed to a structural schematic of the implementations described herein. As recognized by those of ordinary skill in the art, items shown separately could be combined and some items could be separated. For example, some functional modules shown separately in FIG. **2** could be implemented in a single module and the various functions of single functional blocks could be implemented by one or more functional blocks in various implementations. The actual number of modules and the division of particular functions and how features are allocated among them will vary from one embodiment to another and, in some implementations, depends in part on the particular combination of hardware, software, and/or firmware chosen for a particular embodiment.

FIG. **3** is a block diagram of an example of the electronic device **120** in accordance with some implementations. While certain specific features are illustrated, those skilled in the art will appreciate from the present disclosure that various other features have not been illustrated for the sake of brevity, and so as not to obscure more pertinent aspects of the implementations disclosed herein. To that end, as a non-limiting example, in some implementations, the electronic device **120** includes one or more processing units **302** (e.g., microprocessors, ASICs, FPGAs, GPUs, CPUs, processing cores, and/or the like), one or more input/output (I/O) devices and sensors **306**, one or more communication interfaces **308** (e.g., USB, IEEE 802.3x, IEEE 802.11x, IEEE 802.16x, GSM, CDMA, TDMA, GPS, IR, BLUETOOTH, ZIGBEE, and/or the like type interface), one or more programming (e.g., I/O) interfaces **310**, one or more displays **312**, one or more optional interior and/or exterior facing image sensors **314**, one or more optional depth sensors **316**, a memory **320**, and one or more communication buses **304** for interconnecting these and various other components.

In some implementations, the one or more communication buses **304** include circuitry that interconnects and controls communications between system components. In some implementations, the one or more I/O devices and sensors **306** include at least one of an inertial measurement unit (IMU), an accelerometer, a gyroscope, a thermometer, one or more physiological sensors (e.g., blood pressure monitor, heart rate monitor, blood oxygen sensor, blood glucose sensor, etc.), one or more microphones, one or more speakers, a haptics engine, a heating and/or cooling unit, a skin shear engine, and/or the like.

In some implementations, the one or more displays **312** are configured to present the SR experience to the user. In some implementations, the one or more displays **312** are also configured to present flat video content to the user (e.g., a 2-dimensional or "flat" AVI, FLV, WMV, MOV, MP4, or the like file associated with a TV episode or a movie, or live video pass-through of the physical setting **105**). In some implementations, the one or more displays **312** correspond to holographic, digital light processing (DLP), liquid-crystal display (LCD), liquid-crystal on silicon (LCoS), organic light-emitting field-effect transitory (OLET), organic light-emitting diode (OLED), surface-conduction electron-emitter display (SED), field-emission display (FED), quantum-dot light-emitting diode (QD-LED), micro-electro-mechanical system (MEMS), and/or the like display types. In some implementations, the one or more displays **312** correspond to diffractive, reflective, polarized, holographic, etc. waveguide displays. For example, the electronic device **120** includes a single display. In another example, the electronic device **120** includes a display for each eye of the user. In some implementations, the one or more displays **312** are capable of presenting AR and VR content. In some implementations, the one or more displays **312** are capable of presenting AR or VR content.

In some implementations, the one or more optional image sensors **314** are configured to obtain image data that corresponds to at least a portion of the face of the user that includes the eyes of the user. For example, the one or more optional image sensors **314** correspond to one or more RGB cameras (e.g., with a complementary metal-oxide-semiconductor (CMOS) image sensor or a charge-coupled device (CCD) image sensor), infrared (IR) image sensors, event-based cameras, and/or the like.

In some implementations, the one or more optional depth sensors **316** are configured to obtain depth data that corresponds to at least a portion of the face of the user and to synthesize a depth/mesh map of the face of the user, where the mesh map characterizes the facial topography of the user. For example, the one or more optional depth sensors **316** correspond to a structured light device, a time-of-flight device, and/or the like.

The memory **320** includes high-speed random-access memory, such as DRAM, SRAM, DDR RAM, or other random-access solid-state memory devices. In some implementations, the memory **320** includes non-volatile memory, such as one or more magnetic disk storage devices, optical disk storage devices, flash memory devices, or other non-volatile solid-state storage devices. The memory **320** optionally includes one or more storage devices remotely located from the one or more processing units **302**. The memory **320** comprises a non-transitory computer readable storage medium. In some implementations, the memory **320** or the non-transitory computer readable storage medium of the memory **320** stores the following programs, modules and data structures, or a subset thereof including an optional operating system **330** and an SR presentation engine **340**.

The operating system **330** includes procedures for handling various basic system services and for performing hardware dependent tasks. In some implementations, the SR presentation engine **340** is configured to present SR content to the user via the one or more displays **312**. To that end, in various implementations, the SR presentation engine **340** includes a data obtainer **342**, an SR presenter **344**, a user interaction handler **346**, and a data transmitter **350**.

In some implementations, the data obtainer **342** is configured to obtain data (e.g., presentation data, user interaction data, sensor data, location data, etc.) from at least one of sensors in the physical setting **105**, sensors associated with the electronic device **120**, the controller **110**, and the display device **130**. To that end, in various implementations, the data obtainer **342** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the SR presenter **344** is configured to present SR content via the one or more displays **312**. In some implementations, the SR presenter **344** is also configured to present flat video content via the one or more displays **312**. To that end, in various implementations, the SR presenter **344** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the user interaction handler **346** is configured to detect and interpret user interactions with

the presented SR content. To that end, in various implementations, the user interaction handler **346** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the data transmitter **350** is configured to transmit data (e.g., presentation data, location data, user interaction data, etc.) to at least one of the controller **110** and the display device **130**. To that end, in various implementations, the data transmitter **350** includes instructions and/or logic therefor, and heuristics and metadata therefor.

Although the data obtainer **342**, the SR presenter **344**, the user interaction handler **346**, and the data transmitter **350** are shown as residing on a single device (e.g., the electronic device **120**), it should be understood that in other implementations, any combination of the data obtainer **342**, the SR presenter **344**, the user interaction handler **346**, and the data transmitter **350** may be located in separate computing devices.

Moreover, FIG. **3** is intended more as a functional description of the various features which are present in a particular embodiment as opposed to a structural schematic of the implementations described herein. As recognized by those of ordinary skill in the art, items shown separately could be combined and some items could be separated. For example, some functional modules shown separately in FIG. **3** could be implemented in a single module and the various functions of single functional blocks could be implemented by one or more functional blocks in various implementations. The actual number of modules and the division of particular functions and how features are allocated among them will vary from one embodiment to another and, in some implementations, depends in part on the particular combination of hardware, software, and/or firmware chosen for a particular embodiment.

FIG. **4** is a block diagram of an example of the display device **130** in accordance with some implementations. While certain specific features are illustrated, those skilled in the art will appreciate from the present disclosure that various other features have not been illustrated for the sake of brevity, and so as not to obscure more pertinent aspects of the implementations disclosed herein. To that end, as a non-limiting example, in some implementations the display device **130** includes one or more processing units **402** (e.g., microprocessors, ASICs, FPGAs, GPUs, CPUs, processing cores, and/or the like), one or more input/output (I/O) devices and sensors **406**, one or more communication interfaces **408** (e.g., USB, IEEE 802.3x, IEEE 802.11x, IEEE 802.16x, GSM, CDMA, TDMA, GPS, IR, BLUETOOTH, ZIGBEE, and/or the like type interface), one or more programming (e.g., I/O) interfaces **410**, a display **412**, a memory **420**, and one or more communication buses **404** for interconnecting these and various other components. In some implementations, the display device **130** is optionally controlled by a remote-control device, voice commands, the electronic device **120**, or the like.

In some implementations, the one or more communication buses **404** include circuitry that interconnects and controls communications between system components. In some implementations, the one or more I/O devices and sensors **406** include at least one of one or more IR sensors, one or more physical buttons, one or more microphones, one or more speakers, one or more image sensors, one or more depth sensors, and/or the like.

In some implementations, the display **412** corresponds to holographic, digital light processing (DLP), liquid-crystal display (LCD), liquid-crystal on silicon (LCoS), organic light-emitting field-effect transitory (OLET), organic light-emitting diode (OLED), surface-conduction electron-emitter display (SED), field-emission display (FED), quantum-dot light-emitting diode (QD-LED), micro-electro-mechanical system (MEMS), and/or the like display types.

The memory **420** includes high-speed random-access memory, such as DRAM, SRAM, DDR RAM, or other random-access solid-state memory devices. In some implementations, the memory **420** includes non-volatile memory, such as one or more magnetic disk storage devices, optical disk storage devices, flash memory devices, or other non-volatile solid-state storage devices. The memory **420** optionally includes one or more storage devices remotely located from the one or more processing units **402**. The memory **420** comprises a non-transitory computer readable storage medium. In some implementations, the memory **420** or the non-transitory computer readable storage medium of the memory **420** stores the following programs, modules and data structures, or a subset thereof including an optional operating system **430** and a presentation engine **440**.

The operating system **430** includes procedures for handling various basic system services and for performing hardware dependent tasks. In some implementations, the presentation engine **440** is configured to present media content (e.g., video and/or audio content) to users via the display **412** and the one or more I/O devices and sensors **406** (e.g., one or more speakers). To that end, in various implementations, the presentation engine **440** includes a data obtainer **442**, a content presenter **444**, an interaction handler **446**, and a data transmitter **450**.

In some implementations, the data obtainer **442** is configured to obtain data (e.g., presentation data, user interaction data, etc.) from at least one of sensors in the physical setting **105**, sensors associated with the display device **130**, the controller **110**, and the electronic device **120**. To that end, in various implementations, the data obtainer **442** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the content presenter **444** is configured to render and display video content via the display **412**. To that end, in various implementations, the content presenter **444** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the interaction handler **446** is configured to detect and interpret user interactions with the display device **130** (e.g., navigation, playback, tuning, volume adjustment, or the like commands). To that end, in various implementations, the interaction handler **446** includes instructions and/or logic therefor, and heuristics and metadata therefor.

In some implementations, the data transmitter **450** is configured to transmit data (e.g., presentation data, user interaction data, etc.) to at least one of the controller **110** and the electronic device **120**. To that end, in various implementations, the data transmitter **450** includes instructions and/or logic therefor, and heuristics and metadata therefor.

Although the data obtainer **442**, the content presenter **444**, the interaction handler **446**, and the data transmitter **450** are shown as residing on a single device (e.g., the display device **130**), it should be understood that in other implementations, any combination of the data obtainer **442**, the content presenter **444**, the interaction handler **446**, and the data transmitter **450** may be located in separate computing devices.

Moreover, FIG. **4** is intended more as a functional description of the various features which are present in a particular embodiment as opposed to a structural schematic of the implementations described herein. As recognized by

those of ordinary skill in the art, items shown separately could be combined and some items could be separated. For example, some functional modules shown separately in FIG. **4** could be implemented in a single module and the various functions of single functional blocks could be implemented by one or more functional blocks in various implementations. The actual number of modules and the division of particular functions and how features are allocated among them will vary from one embodiment to another and, in some implementations, depends in part on the particular combination of hardware, software, and/or firmware chosen for a particular embodiment.

FIG. **5** illustrates an example content timeline **500** in accordance with some implementations. While pertinent features are shown, those of ordinary skill in the art will appreciate from the present disclosure that various other features have not been illustrated for the sake of brevity and so as not to obscure more pertinent aspects of the example implementations disclosed herein. To that end, as a non-limiting example, the content timeline **500** includes plot settings **515**A, **515**B, and **515**C associated with different time periods of the video content within the content timeline **500** (e.g., a spaceship engine room scene, a spaceship bridge scene, and a transport craft cockpit scene). As one example, in FIG. **5**, SR companion content **510**A is associated with plot setting **515**A (e.g., a mission to help the crew fix the fusion reactor in the spaceship engine room). As another example, the SR companion content **510**B is associated with plot setting **515**B (e.g., the ability to explore the spaceship bridge and interact with the crew). As yet another example, the SR companion content **510**C is associated with plot setting **515**C (e.g., a mission to help navigate the transport craft).

FIGS. **6**A-**6**D illustrate example playback scenarios in accordance with some implementations. While pertinent features are shown, those of ordinary skill in the art will appreciate from the present disclosure that various other features have not been illustrated for the sake of brevity and so as not to obscure more pertinent aspects of the example implementations disclosed herein.

As shown in FIG. **6**A, for example, the scene playback scenario **600**A includes a transition from the display of the video content **610** that includes the characters **605***a* and **605***b* via the display device **130** to the presentation of the SR companion content **620**A via the electronic device **120**. In this example, the characters **605***a* and **605***b* within the video content **610** are displayed on the display **122** of the electronic device **120** as if they are present within the physical setting **103** and standing around the table **107**. The user of the electronic device **120** is able to instruct the characters **605***a* and **605***b* to perform a task or mission associated with a current scene within the video content **610** and/or converse/interact with the characters **605***a* and **605***b*. In other words, in some implementations, the video content **610** is transferred into the environs of the user, and the user is able to interact with the SR companion content **620**A. For example, the user is holding the electronic device **120**, and the electronic device **120** enables video pass-through of the physical setting **103**.

In some implementations, the display device **130** concurrently displays the video content **610** while the electronic device **120** presents the SR companion content **620**A. In some implementations, the video content **610** is paused while the electronic device **120** presents the SR companion content **620**A. In some implementations, both the video content **610** and the SR companion content **620**A are presented via the electronic device **120**.

As shown in FIG. **6**B, for example, the scene playback scenario **600**B includes a first transition from the display of the video content **610** that includes the characters **605***a* and **605***b* via the display device **130** to the presentation of the SR companion content **620**B via the electronic device **120**. In this example, the user **150** may be placed within the plot setting to perform a task or mission associated with the plot setting, explore the plot setting, and/or converse with the characters **605***a* and **605***b* while present in an SR reconstruction of the plot setting (e.g., within a VR setting). In other words, in some implementations, the user **150** is placed into the plot setting and is able to interact with the SR companion content **620**B. Continuing with this example, the playback scenario **600**B includes a second transition from the presentation of the SR companion content **620**B via the electronic device **120** to the display of the video content **610** via the display device **130**. In some implementations, each plot setting is associated with one instance of SR companion content. In some implementations, each plot setting is associated with multiple instance of SR companion (e.g., different mission or tasks associated with the plot setting) content that may be separately selected by the user.

In some implementations, the display device **130** concurrently displays the video content **610** while the electronic device **120** presents the SR companion content **620**B. In some implementations, the video content **610** is paused while the electronic device **120** presents the SR companion content **620**B. In some implementations, both the video content **610** and the SR companion content **620**B are presented via the electronic device **120**.

As one example, the user **150** is wearing the electronic device **120** between the aforementioned transitions. In this example, with reference to FIGS. **1**B and **6**B, the electronic device **120** enables video pass-through of the physical setting **105** so that the user **150** can see the video content **610** displayed via the display device **130** while wearing the electronic device **120**. As another example, both the video content **610** and the SR companion content **620**B are displayed via the electronic device **120**.

As shown in FIG. **6**C, for example, the scene playback scenario **650**A includes the display device **130** displaying video content **675** (e.g., a TV episode or movie) and the user holding the electronic device **120**, while the electronic device **120** displays video pass-through of the physical setting **660** (e.g., the user's living room) on the display **122**. After requesting to view SR companion content associated with the video content **675**, the electronic device **120** presents SR content **670***a*, **670***b*, **670***c*, **670***d*, **670***e*, **670***f*, **670***g*, **672**, and **674** associated with the video content **675**. For example, in FIG. **6**C, the user is tasked with collecting the SR content **670***a*, **670***b*, **670***c*, **670***d*, **670***e*, **670***f*, and **670***g* (e.g., AR candies) scattered around the physical setting **660** and placing them in the SR basket **672** for the SR extraterrestrial protagonist **674** associated with the video content **675** by performing touch gestures on the display **122**. As such, in this example, the SR companion content leverages the current environs of the user (e.g., the physical setting **660** in FIG. **6**C) when providing a task for the user **150** to perform (e.g., collecting AR candies).

As shown in FIG. **6**D, for example, the scene playback scenario **650**B includes the display device **130** displaying video content **675** (e.g., a TV episode or movie) and the user **150** wearing the electronic device **120** on his/her head (e.g., AR-enabled glasses) with optical see-through of the physical setting **660** (e.g., the user's living room). After requesting to view SR companion content associated with the video content **675**, the electronic device **120** presents SR content

670*a*, **670***b*, **670***c*, **670***d*, **670***e*, **670***f*, **670***g*, **672**, and **674** associated with the video content **675**. For example, in FIG. **6**D, the user **150** is tasked with collecting the SR content **670***a*, **670***b*, **670***c*, **670***d*, **670***e*, **670***f*, and **670***g* (e.g., SR candies) scattered around the physical setting **660** and placing them in the SR basket **672** for the SR extraterrestrial protagonist **674** associated with the video content **675**. As such, in this example, the SR companion content leverages the current environs of the user (e.g., the physical setting **660** in FIG. **6**D) when providing a task for the user **150** to perform (e.g., collecting AR candies).

FIG. **7** is a flowchart representation of a method **700** of presenting SR companion content in accordance with some implementations. In various implementations, the method **700** is performed by a device with non-transitory memory and one or more processors coupled with the non-transitory memory (e.g., the controller **110** in FIGS. **1**B and **2**, the electronic device **120** in FIGS. **1**A-**1**B and **3**, or a suitable combination thereof). In some implementations, the method **700** is performed by processing logic, including hardware, firmware, software, or a combination thereof. In some implementations, the method **700** is performed by a processor executing code stored in a non-transitory computer-readable medium (e.g., a memory). Briefly, in some circumstances, the method **700** includes: while causing presentation video content having a current plot setting, receiving a user input indicating a request to explore the current plot setting; obtaining (e.g., receiving, retrieving, or generating) SR content associated with the current plot setting in response to receiving the user input; causing presentation the SR content associated with the current plot setting; receiving one or more user interactions with the SR content; and adjusting the presentation of the SR content in response to receiving the one or more user interactions with the SR content.

As represented by block **7-1**, the method **700** includes, while causing presentation video content having a current plot setting, receiving a user input indicating a request to explore the current plot setting. In some implementations, the video content is being displayed on a TV and the SR content is presented via an HMD. In some implementations, a controller coordinates the transition between the TV and the HMD. In some implementations, the video content includes a notification (e.g., superimposed or overlaid on the video content) that SR companion content is available for the current plot setting for the next X seconds. In some implementations, the user input corresponds to a voice command, selection of a TV remote button, movement of the TV remote, head movement, eye movement, or the like while the notification is displayed. In some implementations, both the video content and the SR content are presented via an HMD.

As represented by block **7-2**, the method **700** includes obtaining (e.g., receiving, retrieving, or generating) SR content associated with the current plot setting in response to receiving the user input. In some implementations, the SR content associated with the current plot setting is obtained from a local or remote library (e.g., a remote server, a third-party content provider, or the like) of SR content associated with the video content. In some implementations, the SR content is generated on-the-fly based at least in part on the video content and the current plot setting. In some implementations, the SR content is generated on-the-fly according to a set of predefined rules and policies (e.g., the ability for the user to interact in SR with the current plot setting and characters in the current plot setting).

As represented by block **7-3**, the method **700** includes causing presentation the SR content associated with the current plot setting. In some implementations, the video content is associated with a library of available SR companion content. For example, the SR companion content corresponds to the user being placed into the current plot setting to explore the setting and interact with characters in the plot setting. As such, the user can explore the plot setting with a richness not enabled by the fixed camera angle of the flat video content. In one example, the user's exploration is restricted to the room associated with the current plot setting. In another example, the user is able to explore other rooms adjacent to the current plot setting. In yet another example, the SR companion content corresponds to the user being placed into the current plot setting and tasked with completing a mission to drive the plot forward. In yet another example, the SR companion content corresponds to the user being placed into the making/filming of the current plot setting.

As represented by block **7-4**, the method **700** includes receiving one or more user interactions with the SR content. As represented by block **7-5**, the method **700** includes adjusting the presentation of the SR content in response to receiving the one or more user interactions with the SR content. In some implementations, the SR companion content is driven based on the user interactions therewith such as body pose inputs/actions, eye movements, voice commands, and/or the like. As one example, the user performs a task or mission associated with the plot setting such as retrieving an item associated with the plot setting or clearing a path in the plot setting of bad guys or debris for the protagonist of the video content. As another example, the user inspects objects in the plot setting, fights villains, questions characters in the plot setting, opens doors and explores adjacent rooms, locomotes within the plot setting, and/or the like (e.g., as shown in FIGS. **6**A-**6**B). As yet another example, the SR companion content corresponds to an educational aide or auxiliary information associated with the video content such as an AR version of the Ho Chi Minh Trail or an AR battlefield map showing the location of military battalions while watching a documentary on the Vietnam War. As yet another example, the SR companion content leverages the user's current environs when providing a task for the user to perform such as collecting SR candies scattered around your living room to give to an extraterrestrial protagonist in the video content (e.g., as shown in FIGS. **6**C-**6**D).

FIG. **8** is a flowchart representation of a method **800** of presenting SR companion content in accordance with some implementations. In various implementations, the method **800** is performed by a device with non-transitory memory and one or more processors coupled with the non-transitory memory (e.g., the controller **110** in FIGS. **1**B and **2**, the electronic device **120** in FIGS. **1**A-**1**B and **3**, or a suitable combination thereof). In some implementations, the method **800** is performed by processing logic, including hardware, firmware, software, or a combination thereof. In some implementations, the method **800** is performed by a processor executing code stored in a non-transitory computer-readable medium (e.g., a memory). Briefly, in some circumstances, the method **800** includes: presenting video content having a current plot setting; obtaining SR content associated with the current plot setting; presenting a prompt indicating that SR content associated with the current plot setting is available; obtaining a request to experience the SR content associated with the current plot setting; presenting the SR content associated with the current plot setting;

detecting user interactions with the SR content associated with the current plot setting; adjusting the SR content according to the user interactions; and ceasing to present the SR content and presenting the video content.

As represented by block **8-1**, the method **800** includes presenting video content having a current plot setting. In some implementations, the electronic device **120** or a component thereof (e.g., the SR presenter **344**) presents the video content (e.g., the video content **610** in FIGS. **6**A-**6**B) via the one or more displays **312**. In some implementations, the display device **130** or a component thereof (e.g., the content presenter **444**) presents the video content via the display **412**. In some implementations, the controller **110** or a component thereof (e.g., the content management unit **248**) causes and manages the presentation of the video content by the electronic device **120** and/or the display device **130**. For example, the video content corresponds to a TV episode or movie.

As represented by block **8-2**, the method **800** includes obtaining (e.g., receiving, retrieving, or generating) SR content associated with the current plot setting. In some implementations, the controller **110** or a component thereof (e.g., the companion content obtainer **246**) obtains the SR content associated with the current plot setting from a local library or a remote library (e.g., a remote server, a third-party content provider, or the like). In some implementations, the SR content is obtained from a library associated with the video content currently being viewed by the user. In some implementations, the SR content is generated on-the-fly based at least in part on the video content and the current plot setting. In some implementations, the SR content is generated on-the-fly according to a set of predefined rules and policies (e.g., the ability for the user to interact in SR with the current plot setting and characters in the current plot setting).

As represented by block **8-3**, the method **800** includes presenting a prompt indicating that SR content associated with the current plot setting is available. In some implementations, after obtaining the SR content associated with the current plot setting in the video content, the controller **110** or a component thereof (e.g., the content management unit **248**) transmits a message to the electronic device **120** and/or the display device **130** indicating that SR companion content is available for the current plot setting in the video content. In some implementations, a subtle transition affordance or notification is embedded within the video content indicating that SR companion content associated with the current plot setting in the video content is available (e.g., the companion content).

As represented by block **8-4**, the method **800** includes obtaining a request to experience the SR content associated with the current plot setting. For example, when the user selects the transition affordance (e.g., via a voice command received by the electronic device **120** or the display device **130**, a remote-control device associated with the display device **130**, or the like), the electronic device **120** or display device **130** provides a message to the controller **110** indicating the user's intent to experience the SR content associated with the current plot setting. Continuing with this example, in response to receiving the message, the controller **110** or a component thereof (e.g., the data transmitter **250**) provides presentation data (e.g., rendered SR frames or access to the SR content associated with the current plot setting) to the electronic device **120** for presentation to the user.

As represented by block **8-5**, the method **800** includes presenting the SR content associated with the current plot setting. In some implementations, the electronic device **120** or a component thereof (e.g., the SR presenter **344**) presents the SR content (e.g., the SR companion content **620**A in FIG. **6**A) associated with the current plot setting via the one or more displays **312**. In some implementations, the user experience is transitioned from a first electronic device (e.g., a TV, tablet, or the like) displaying flat video content, to a second SR capable device (e.g., an HMD, phone, tablet, etc.) displaying the SR content associated with the video content (e.g., the companion SR content). As one example, FIG. **6**B illustrates the example playback scenario **600**B where the user views the video content **610** via the display device **130** and, then, transitions to the user viewing the SR companion content **620**B via the electronic device **120**. In some implementations, both the video content **610** and the SR companion content **620**B are presented via the electronic device **120**.

In some implementations, the video content continues concurrently while the user explores the current plot setting (e.g., within a time window dictated by the current plot setting). In some implementations, the video content pauses in response to user exploration of plot setting beyond a threshold region (e.g., user explores a room adjacent to the current plot setting). In some implementations, the video content is paused while the user explores the current plot setting.

As represented by block **8-6**, the method **800** includes detecting user interactions with the SR content associated with the current plot setting. In some implementations, the electronic device **120** or a component thereof (e.g., the user interaction handler **346**) detects user interactions with the SR companion content. In some implementations, the electronic device **120** or a component thereof (e.g., the data transmitter **350**) sends data associated with the user interactions to the controller **110**. For example, the user picks up an object in the SR reconstruction of the current plot setting. As another example, the user fights humanoid characters in the current plot setting. In yet another example, the user speaks with characters in the current plot setting. In yet another example, the user walks around the current plot setting to view the current plot setting from various angles. In some implementations, the video content is paused while the user completes a task or mission associated with the current plot setting in order to advance the video content.

As represented by block **8-7**, the method **800** includes adjusting the SR content according to the user interactions. In some implementations, the electronic device **120** or a component thereof (e.g., the content management unit **248**) adjusts the SR companion content according to the user interaction detected at block **8-6**. In some implementations, the controller **110** or a component thereof (e.g., the content management unit **248**) adjusts the SR companion content according to the user interactions detected at block **8-6**. For example, if a user drops an SR coffee cup from the current plot setting, the SR coffee cup should subsequently fall to the floor and break and/or spill a liquid. In some implementations, as the user interacts with the SR content, the electronic device **120** provides audio, haptic, skin shear, temperature, or the like feedback.

As represented by block **8-8**, the method **800** includes detecting satisfaction of an SR exit condition. In some implementations, the exit condition is satisfied when the user provides an escape command (e.g., a gesture, voice command, or the like). In some implementations, the exit condition is satisfied when the user completes a mission or task associated with the current plot setting (e.g., defeating several henchmen in simulated hand-to-hand combat, solving a puzzle, or questioning a character to receive particular

information). In some implementations, the exit condition is satisfied when a predefined time period expires.

As represented by block **8-9**, the method **800** includes ceasing to present the SR content and presenting the video content. In some implementations, the electronic device **120** or a component thereof (e.g., the SR presenter **344**) ceases presentation of the SR content associated with the current plot setting (e.g., the SR companion content) via the one or more displays **312**. Subsequently, in some implementations, the electronic device **120** or a component thereof (e.g., the SR presenter **344**) presents the video content via the one or more displays **312**. Alternatively, in some implementations, the display device **130** or a component thereof (e.g., the content presenter **444**) presents the video content via the display **412**.

In some implementations, the user experience is transitioned from the second SR device (e.g., HMD, phone, tablet, etc.) displaying the SR content associated with the video content (e.g., the companion SR content), to the first device (e.g., TV, tablet, or the like) displaying the flat video content. As one example, FIG. **6**B illustrates the example playback scenario **600**B where the user views the SR companion content **620**B via the electronic device **120**, and, then, transitions to the user viewing the video content **610** via the display device **130**.

While various aspects of implementations within the scope of the appended claims are described above, it should be apparent that the various features of implementations described above may be embodied in a wide variety of forms and that any specific structure and/or function described above is merely illustrative. Based on the present disclosure one skilled in the art should appreciate that an aspect described herein may be implemented independently of any other aspects and that two or more of these aspects may be combined in various ways. For example, an apparatus may be implemented and/or a method may be practiced using any number of the aspects set forth herein. In addition, such an apparatus may be implemented and/or such a method may be practiced using other structure and/or functionality in addition to or other than one or more of the aspects set forth herein.

It will also be understood that, although the terms "first," "second," etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another. For example, a first node could be termed a second node, and, similarly, a second node could be termed a first node, which changing the meaning of the description, so long as all occurrences of the "first node" are renamed consistently and all occurrences of the "second node" are renamed consistently. The first node and the second node are both nodes, but they are not the same node.

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the claims. As used in the description of the embodiments and the appended claims, the singular forms "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will also be understood that the term "and/or" as used herein refers to and encompasses any and all possible combinations of one or more of the associated listed items. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

As used herein, the term "if" may be construed to mean "when" or "upon" or "in response to determining" or "in accordance with a determination" or "in response to detecting," that a stated condition precedent is true, depending on the context. Similarly, the phrase "if it is determined [that a stated condition precedent is true]" or "if [a stated condition precedent is true]" or "when [a stated condition precedent is true]" may be construed to mean "upon determining" or "in response to determining" or "in accordance with a determination" or "upon detecting" or "in response to detecting" that the stated condition precedent is true, depending on the context.

What is claimed is:

1. A method comprising:

at a computing system including non-transitory memory and one or more processors, wherein the computing system is communicatively coupled to a display device and one or more input devices:

while causing presentation of video content, obtaining, via the one or more input devices, a user input indicating a request to view synthesized reality (SR) content associated with the video content;

in accordance with a determination that the video content includes a first scene associated with to a first time period of the video content when the user input was detected:

obtaining first SR content for the first time period of the video content, wherein the first SR content is associated with the first scene within the video content;

obtaining one or more missions or tasks associated with the first scene within the video content; and

causing presentation of the first SR content associated with the first scene within the video content and a first indication of the one or more missions or tasks associated with the first scene within the video content via the display device; and

in accordance with a determination that the video content includes a second scene associated with to a second time period of the video content when the user input was detected:

obtaining second SR content for the first time period of the video content, wherein the second SR content is associated with the second scene within the video content;

obtaining one or more missions or tasks associated with the second scene within the video content; and

causing presentation of the second SR content associated with the second scene within the video content and a second indication of the one or more missions or tasks associated with the second scene within the video content via the display device.

2. The method of claim **1**, wherein the first SR content and second SR content are obtained from a library associated with the video content.

3. The method of claim **1**, wherein the first SR content is generated on-the-fly based at least in part on the first scene within the video content, and wherein the second SR content is generated on-the-fly based at least in part on the second scene within the video content.

4. The method of claim **1**, wherein the first SR content continues concurrently while causing presentation of the first SR content, and wherein the second SR content continues concurrently while causing presentation of the second SR content.

5. The method of claim 4, wherein the first SR content is paused in response to the user breaching a first threshold region associated with the first SR content, and wherein the second SR content is paused in response to the user breaching a second threshold region associated with the second SR content.

6. The method of claim 1, wherein the first SR content is paused while causing presentation of the first SR content, and wherein the second SR content is paused while causing presentation of the second SR content.

7. The method of claim 1, further comprising:

while presenting the first SR content and in response to receiving a first command from the user, ceasing to present the first SR content and continuing causing presentation of the first scene associated with to the first time period of the video content; and

while presenting the second SR content and in response to receiving a second command from the user, ceasing to present the second SR content and continuing causing presentation of the second scene associated with to the second time period of the video content.

8. The method of claim 1, further comprising:

while causing presentation of the video content that includes the first scene, causing display of a first affordance indicating availability of the first SR content associated with the first scene within the video content, wherein the user input corresponds to selection of the first affordance; and

while causing presentation of the video content that includes the second scene, causing display of a second affordance indicating availability of the second SR content associated with the second scene within the video content, wherein the user input corresponds to selection of the second affordance.

9. The method of claim 1, further comprising:

while causing presentation of the first SR content

obtaining, via the one or more input devices, one or more user interactions with the first SR content; and

adjusting the first SR content in response to receiving the one or more user interactions with the first SR content; and

while causing presentation of the second SR content

obtaining, via the one or more input devices, one or more user interactions with the second SR content; and

adjusting the first SR content in response to receiving the one or more user interactions with the second SR content.

10. The method of claim 9, wherein the one or more user interactions with the first SR content include at least one of picking up an object associated with the first SR content, physically engaging with an SR character associated with the first SR content, or speaking with an SR character associated with the first SR content.

11. The method of claim 9, further comprising:

in response to determining that the one or more user interactions with the first SR content satisfy an exit condition for the first scene, ceasing to cause presentation of the first SR content and causing presentation of the first scene associated with to the first time period of the video content, wherein the exit condition for the first scene is satisfied when the one or more user interactions with the first SR content complete a mission or task associated with the first scene within the video content; and

in response to determining that the one or more user interactions with the second SR content satisfy an exit condition for the second scene, ceasing to cause presentation of the second SR content and causing presentation of the second scene associated with to the second time period of the video content, wherein the exit condition for the second scene is satisfied when the one or more user interactions with the second SR content complete a mission or task associated with the second scene within the video content.

12. The method of claim 1, further comprising:

while causing presentation of the first SR content

obtaining, via the one or more input devices, one or more commands associated with driving a first SR character within the first SR content; and

adjusting the first SR content in response to obtaining the one or more commands associated with driving the first SR character within the first SR content; and

while causing presentation of the second SR content

obtaining, via the one or more input devices, one or more commands associated with driving a second SR character within the second SR content; and

adjusting the second SR content in response to obtaining the one or more commands associated with driving the second SR character within the second SR content.

13. The method of claim 1, further comprising:

presenting, via the display device, the one or more missions or tasks associated with the first scene within the video content; and

detecting, via the one or more input devices, a user input selecting a respective mission or task among the one or more missions or tasks associated with the first scene within the video content, wherein the first indication corresponds to the respective mission or task selected by the user input.

14. A computing system comprising:

one or more processors;

a non-transitory memory;

an interface for communicating with a display device and one or more input devices; and

one or more programs stored in the non-transitory memory, which, when executed by the one or more processors, cause the computing system to:

while causing presentation of video content, obtain, via the one or more input devices, a user input indicating a request to view synthesized reality (SR) content associated with the video content;

in accordance with a determination that the video content includes a first scene associated with to a first time period of the video content when the user input was detected:

obtain first SR content for the first time period of the video content, wherein the first SR content is associated with the first scene within the video content;

obtain one or more missions or tasks associated with the first scene within the video content; and

cause presentation of the first SR content associated with the first scene within the video content and a first indication of the one or more missions or tasks associated with the first scene within the video content via the display device; and

in accordance with a determination that the video content includes a second scene associated with to a second time period of the video content when the user input was detected:

obtain second SR content for the first time period of the video content, wherein the second SR content is associated with the second scene within the video content;

obtain one or more missions or tasks associated with the second scene within the video content; and

cause presentation of the second SR content associated with the second scene within the video content and a second indication of the one or more missions or tasks associated with the second scene within the video content via the display device.

15. The computing system of claim **14**, wherein the one or more programs further cause the computing system to:

while causing presentation of the first SR content

obtain, via the one or more input devices, one or more user interactions with the first SR content; and

adjust the first SR content in response to receiving the one or more user interactions with the first SR content; and

while causing presentation of the second SR content

obtain, via the one or more input devices, one or more user interactions with the second SR content; and

adjust the first SR content in response to receiving the one or more user interactions with the second SR content.

16. The computing system of claim **15**, wherein the one or more user interactions with the first SR content include at least one of picking up an object associated with the first SR content, physically engaging with an SR character associated with the first SR content, or speaking with an SR character associated with the first SR content.

17. The computing system of claim **15**, wherein the one or more programs further cause the computing system to:

in response to determining that the one or more user interactions with the first SR content satisfy an exit condition for the first scene, cease to cause presentation of the first SR content and cause presentation of the first scene associated with to the first time period of the video content, wherein the exit condition for the first scene is satisfied when the one or more user interactions with the first SR content complete a mission or task associated with the first scene within the video content; and

in response to determining that the one or more user interactions with the second SR content satisfy an exit condition for the second scene, cease to cause presentation of the second SR content and cause presentation of the second scene associated with to the second time period of the video content, wherein the exit condition for the second scene is satisfied when the one or more user interactions with the second SR content complete a mission or task associated with the second scene within the video content.

18. The computing system of claim **14**, wherein the one or more programs further cause the computing system to:

while causing presentation of the first SR content

obtain, via the one or more input devices, one or more commands associated with driving a first SR character within the first SR content; and

adjust the first SR content in response to obtaining the one or more commands associated with driving the first SR character within the first SR content; and

while causing presentation of the second SR content

obtain, via the one or more input devices, one or more commands associated with driving a second SR character within the second SR content; and

adjust the second SR content in response to obtaining the one or more commands associated with driving the second SR character within the second SR content.

19. A non-transitory memory storing one or more programs, which, when executed by one or more processors of a computing system with an interface for communicating with a display device and one or more input devices, cause the computing system to:

while causing presentation of video content, obtain, via the one or more input devices, a user input indicating a request to view synthesized reality (SR) content associated with the video content;

in accordance with a determination that the video content includes a first scene associated with to a first time period of the video content when the user input was detected:

obtain first SR content for the first time period of the video content, wherein the first SR content is associated with the first scene within the video content;

obtain one or more missions or tasks associated with the first scene within the video content; and

cause presentation of the first SR content associated with the first scene within the video content and a first indication of the one or more missions or tasks associated with the first scene within the video content via the display device; and

in accordance with a determination that the video content includes a second scene associated with to a second time period of the video content when the user input was detected:

obtain second SR content for the first time period of the video content, wherein the second SR content is associated with the second scene within the video content;

obtain one or more missions or tasks associated with the second scene within the video content; and

cause presentation of the second SR content associated with the second scene within the video content and a second indication of the one or more missions or tasks associated with the second scene within the video content via the display device.

20. The non-transitory memory of claim **19**, wherein the one or more programs further cause the computing system to:

while causing presentation of the first SR content

obtain, via the one or more input devices, one or more user interactions with the first SR content; and

adjust the first SR content in response to receiving the one or more user interactions with the first SR content; and

while causing presentation of the second SR content

obtain, via the one or more input devices, one or more user interactions with the second SR content; and

adjust the first SR content in response to receiving the one or more user interactions with the second SR content.

21. The non-transitory memory of claim **20**, wherein the one or more user interactions with the first SR content include at least one of picking up an object associated with the first SR content, physically engaging with an SR character associated with the first SR content, or speaking with an SR character associated with the first SR content.

22. The non-transitory memory of claim **20**, wherein the one or more programs further cause the computing system to:

in response to determining that the one or more user interactions with the first SR content satisfy an exit condition for the first scene, cease to cause presentation of the first SR content and cause presentation of the first scene associated with to the first time period of the video content, wherein the exit condition for the first scene is satisfied when the one or more user interactions with the first SR content complete a mission or task associated with the first scene within the video content; and

in response to determining that the one or more user interactions with the second SR content satisfy an exit condition for the second scene, cease to cause presentation of the second SR content and cause presentation of the second scene associated with to the second time period of the video content, wherein the exit condition for the second scene is satisfied when the one or more user interactions with the second SR content complete a mission or task associated with the second scene within the video content.

23. The non-transitory memory of claim **19**, wherein the one or more programs further cause the computing system to:

while causing presentation of the first SR content

obtain, via the one or more input devices, one or more commands associated with driving a first SR character within the first SR content; and

adjust the first SR content in response to obtaining the one or more commands associated with driving the first SR character within the first SR content; and

while causing presentation of the second SR content

obtain, via the one or more input devices, one or more commands associated with driving a second SR character within the second SR content; and

adjust the second SR content in response to obtaining the one or more commands associated with driving the second SR character within the second SR content.

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